

Service
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Service Manual

Contents	Page	Contents	Page
1. Revision List	2	J 715G7788 IR/LED Panel	184 185
2. Technical Specs. Diversity. and Connections	2	J 715G8045 IR/LED Panel	186 187
3. Precautions, Notes, and Abbreviation List	8	E 715G7872 Keyboard control panel	188 189
4. Mechanical Instructions	12	E 715G7065 Keyboard control panel	190 191
Cable dressing (43" 6501/6551 series)	12	ALC 715G7789 LED board	192 193
Cable dressing (43" 6401 series)	13	AL 715G7004 Ambilight Board	194 196
Cable dressing (49" 6401 series)	13	AL 715G7006 Ambilight Board	197 199
Cable dressing (49" 6501/6551 series)	14	AL 715G7007 Ambilight Board	200 202
Cable dressing (49" 6561/6581 series)	14	AL 715G6981 Ambilight Board	203 205
Cable dressing (49" 71x1 series)	15	AL 715G7008 Ambilight Board	206 210
Cable dressing (55" 6401 series)	15		
Cable dressing (55" 6501/6551 series)	16	11. Styling Sheets	
Cable dressing (55" 6561/6581 series)	16	6501& 6551 series 43"	211
Cable dressing (55" 7101 series)	17	6401 series 43"	212
Cable dressing (55" 7181 series)	17	6401 series 49"	213
Cable dressing (65" 6521/7101 series)	18	6501 & 6551 series 49"	214
Cable dressing (65" 7601 series)	19	6561 & 6581 series 49"	215
Cable dressing (75" 7101 series)	19	7101 series 49"	216
5. Service Modes, Error Codes, and Fault Finding	40	7181 series 49"	217
6. Alignments	49	6401 series 55"	218
7. Circuit Descriptions	53	6501 series 55"	219
8. IC Data Sheets	63	6551 series 55"	220
9. Block Diagrams		6561 & 6581 series 55"	221
Block diagram 64x1 series	73	7101 series 55"	222
Block diagram 65x1/7xx1 series	74	7181 series 55"	223
10. Circuit Diagrams and PWB Layouts		6521/7101 series 65"	224
A 715G7857 PSU	75	7601 series 65"	225
A 715G6973 PSU	81	7101 series 75"	226
A 715G7720 PSU	87		
A 715G7312 PSU	93		
A 715G7831 PSU	99		
A 715G7350 PSU	105		
A 715G7732 PSU	111		
A 715G7854 PSU	117		
A 715G8063 PSU	121		
B 715G7776 SSB	128		
B 715G7772 SSB	154		
J 715G8010 IR/LED Panel	180		
J 715G7785 IR/LED Panel	182		

1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-2 Cable dressing \(43" 6401 series\)](#), and [4-12 Cable dressing \(65" 6521/7101 series\)](#).
- Chapter 5:** Updated table [5-3 Factory mode overview](#).
- Chapter 7:** Updated figure [7-3 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 10:** Added circuit diagrams [10.6 A 715G7350 PSU](#), and [10.23 AL 715G7008 Ambilight Board](#).
- Chapter 11:** Added styling sheets [11.2 6401 series 43"](#), and [11.14 6521/7101 series 65"](#).

Manual xxxx xxx xxxx.2

- Chapter 2:** Updated table [2.1 Technical Specifications](#).

Manual xxxx xxx xxxx.3

- Chapter 2:** Updated table [2.1 Technical Specifications](#).

- Chapter 4:** Added figures [4-14 Cable dressing \(75" 7101 series\)](#).
- Chapter 5:** Updated table [5-3 Factory mode overview](#).
- Chapter 7:** Updated figure [7-3 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 10:** Added circuit diagrams [10.7 A 715G7732 PSU](#), and [10.8 A 715G7854 PSU](#).
- Chapter 11:** Added styling sheets [11.16 7101 series 75"](#).

Manual xxxx xxx xxxx.4

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-13 Cable dressing \(65" 7601 series\)](#).
- Chapter 6:** Updated all of the Chapter [6. Alignments](#).
- Chapter 7:** Updated figure [7-3 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 10:** Added circuit diagrams [10.9 A 715G8063 PSU](#), and [10.15 J 715G8045 IR/LED Panel](#).
- Chapter 11:** Added styling sheets [11.15 7601 series 65"](#).

Manual xxxx xxx xxxx.5

- Chapter 4:** Added figures [5-8 Error code overview](#).

2. Technical Specs, Diversity, and Connections

Index of this chapter:

[2.1 Technical Specifications](#)
[2.2 Directions for Use](#)
[2.3 Connections](#)
[2.4 Chassis Overview](#)

Notes:

- Figures can deviate due to the different set executions.

- Specifications are indicative (subject to change).

2.1 Technical Specifications

For on-line product support please use the links in [Table 2-1](#). Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers and Diversity

CTN	2	4	9						10						11		
			Connection Overview	Mechanics						Block Diagram	Schematics						
				Wire Dressing	Stand Removal	Rear Cover Removal	Keyboard Control Removal	SSB Removal	IR/LED Board Removal		Power Supply	SSB	J (IR/LED)	E (Keyboard/Leading Edge)		ALC(LED LOGO Board)	AL(Ambilight Board)
43PUS6501/12	2-1	4-1	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.1		
43PUS6501/60	2-1	4-1	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.1		
43PUS6551/12	2-1	4-1	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.1		
43PUS6401/12	2-1	4-2	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.6	10.10	10.13	10.16	-	10.19	11.2		
43PUS6401/60	2-1	4-2	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.6	10.10	10.13	10.16	-	10.19	11.2		
43PUT6401/12	2-1	4-2	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.6	10.10	10.13	10.16	-	10.19	11.2		
49PUS6401/12	2-1	4-3	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.19	11.3		
49PUT6401/12	2-1	4-3	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.19	11.3		
49PUS6401/60	2-1	4-3	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.19	11.3		
49PUS6501/12	2-1	4-4	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.4		
49PUS6501/60	2-1	4-4	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.4		
49PUS6551/12	2-1	4-4	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.19	11.4		
49PUS6561/12	2-1	4-5	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.20 & 10.21	11.5		
49PUS6581/12	2-1	4-5	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.2	10.11	10.12	10.16	10.18	10.20 & 10.21	11.5		
49PUS7101/12	2-1	4-6	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.3	10.11	10.14	10.16	10.18	10.22 & 10.20 & 10.21	11.6		
49PUS7101/60	2-1	4-6	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.3	10.11	10.14	10.16	10.18	10.22 & 10.20 & 10.21	11.6		
49PUS7181/12	2-1	4-6	4-22 & 4-23	4-24 & 4-25	4-26	4-27	4-28 & 4-29	9.2	10.3	10.11	10.14	10.16	10.18	10.22 & 10.20 & 10.21	11.7		
55PUS6401/12	2-1	4-7	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.22	11.8		
55PUT6401/12	2-1	4-7	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.22	11.8		
55PUS6401/60	2-1	4-7	-	4-38 & 4-39	4-40	4-41	4-42 & 4-43	9.1	10.2	10.10	10.13	10.16	-	10.22	11.8		
55PUS6501/12	2-1	4-8	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.4	10.11	10.12	10.16	10.18	10.22	11.9		
55PUS6501/60	2-1	4-8	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.4	10.11	10.12	10.16	10.18	10.22	11.9		

CTN	2	4						9	10						11
	Connection Overview	Mechanics						Block Diagram	Schematics						Styling
		Wire Dressing	Stand Removal	Rear Cover Removal	Keyboard Control Removal	SSB Removal	IR/LED Board Removal		Power Supply	SSB	J (IR/LED)	E (Keyboard/Leading Edge)	ALC (LED LOGO Board)	AL (Ambilight Board)	
55PUS6551/12	2-1	4-8	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.4	10.11	10.12	10.16	10.18	10.22	11.10
55PUS6561/12	2-1	4-9	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.4	10.11	10.12	10.17	10.18	10.21	11.11
55PUS6581/12	2-1	4-9	4-31 & 4-32	4-33 & 4-34	4-35	4-36	4-38 & 4-39	9.2	10.4	10.11	10.12	10.17	10.18	10.21	11.11
55PUS7101/12	2-1	4-10	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.3	10.11	10.14	10.16	10.18	10.21	11.12
55PUS7101/60	2-1	4-10	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.3	10.11	10.14	10.16	10.18	10.21	11.12
55PUS7181/12	2-1	4-11	4-22 & 4-23	4-24 & 4-25	4-26	4-27	4-28 & 4-29	9.2	10.5	10.11	10.14	10.16	10.18	10.21	11.13
65PUS6521/12	2-1	4-12	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.5	10.11	10.14	10.17	10.18	10.19 & 10.20 & 10.23	11.14
65PUS6521/60	2-1	4-12	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.5	10.11	10.14	10.17	10.18	10.19 & 10.20 & 10.23	11.14
65PUS7101/12	2-1	4-12	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.5	10.11	10.14	10.17	10.18	10.19 & 10.20 & 10.23	11.14
65PUS7601/12	2-1	4-13	4-44	4-45 & 4-46	4-47	4-48	4-49	9.2	10.9	10.11	10.15	10.17	10.18	10.19 & 10.20 & 10.23	11.15
75PUS7101/12	2-1	4-14	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.7 & 10.8	10.11	10.14	10.17	10.18	10.20 & 10.21 & 10.23	11.16
75PUS7101/60	2-1	4-14	4-15	4-16 & 4-17	4-18	4-19	4-20	9.2	10.7 & 10.8	10.11	10.14	10.17	10.18	10.20 & 10.21 & 10.23	11.16

2.2 Directions for Use

Directions for use can be downloaded from the following websites:

<http://www.philips.com/support>

<http://www.p4c.philips.com>

2.3 Connections

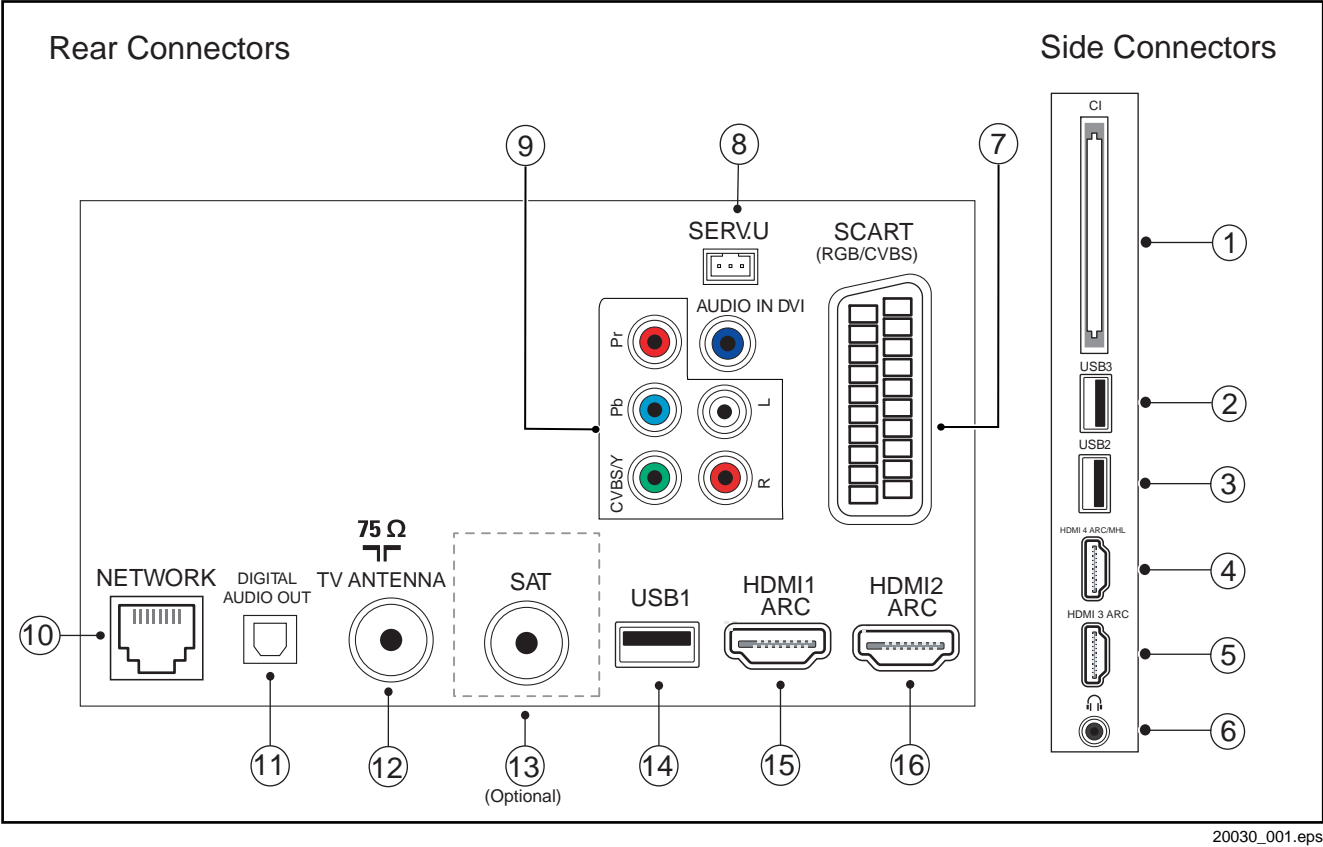


Figure 2-1 Connection overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

4- HDMI 4 ARC/MHL: Digital Video - In, Digital Audio with ARC - In/Out

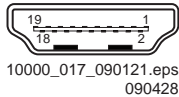


Figure 2-4 HDMI (type A) connector

2.3.1 Side Connections

1 - Cinch: Digital Audio - Out

BK - Coaxial 0.4 - 0.6V_{PP} / 75 W



2 - USB 2.0

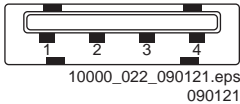


Figure 2-2 USB (type A)

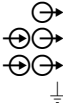
1 - +5V

2 - Data (-)

3 - Data (+)

4 - Ground

Gnd



3 - USB 2.0

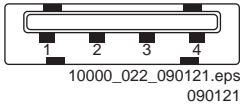


Figure 2-3 USB (type A)

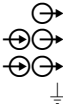
1 - +5V

2 - Data (-)

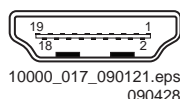
3 - Data (+)

4 - Ground

Gnd



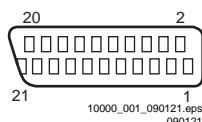
1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- Easylink/CEC	Control channel	
14	- ARC	Audio Return Channel	
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

5- HDMI3 ARC: Digital Video - In, Digital Audio with ARC - In/Out**Figure 2-5 HDMI (type A) connector**

1	- D2+	Data channel	⊕
2	- Shield	Gnd	⊥
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⊥
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕
8	- Shield	Gnd	⊥
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⊥
12	- CLK-	Data channel	⊕
13	- Easylink/CEC	Control channel	⊕
14	- ARC	Audio Return Channel	⊕
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕
17	- Ground	Gnd	⊥
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⊥

6- Head phone (Output)

Bk - Head phone 80 - 600 Ω / 10 mW

**2.3.2 Rear Connections****7 - SCART: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out****Figure 2-6 SCART connector**

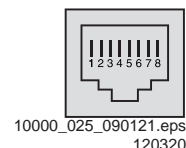
1	- Audio R	0.5 V _{RMS} / 1 kΩ	⊕
2	- Audio R	0.5 V _{RMS} / 10 kΩ	⊕
3	- Audio L	0.5 V _{RMS} / 1 kΩ	⊕
4	- Ground Audio	Gnd	⊥
5	- Ground Blue	Gnd	⊥
6	- Audio L	0.5 V _{RMS} / 10 kΩ	⊕
7	- Video Blue/C-out	0.7 V _{PP} / 75 Ω	⊕
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground Green	Gnd	⊥
10	- n.c.		
11	- Video Green	0.7 V _{PP} / 75 Ω	⊕
12	- n.c.		
13	- Ground Red	Gnd	⊥
14	- Ground P50	Gnd	⊥
15	- Video Red/C	0.7 V _{PP} / 75 Ω	⊕
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 Ω	⊕
17	- Ground Video	Gnd	⊥
18	- Ground FBL	Gnd	⊥
19	- Video CVBS	1 V _{PP} / 75 Ω	⊕
20	- Video CVBS/Y	1 V _{PP} / 75 Ω	⊕
21	- Shield	Gnd	⊥

8- Service / UART

1	- Ground	Gnd	⊥
2	- UART_TX	Transmit	⊕
3	- UART_RX	Receive	⊕

9 - Cinch: Video YPbPr - In, Audio - In

Gn	- Video - Y	1 V _{PP} / 75 W	⊕
Bu	- Video - Pb	0.7 V _{PP} / 75 W	⊕
Rd	- Video - Pr	0.7 V _{PP} / 75 W	⊕
Wh	- Audio - L	0.5 V _{RMS} / 10 kW	⊕
Rd	- Audio - R	0.5 V _{RMS} / 10 kW	⊕

10 - RJ45: Ethernet**Figure 2-7 Ethernet connector**

1	- TD+	Transmit signal	⊕
2	- TD-	Transmit signal	⊕
3	- RD+	Receive signal	⊕
4	- CT	Centre Tap: DC level fixation	
5	- CT	Centre Tap: DC level fixation	
6	- RD-	Receive signal	⊕
7	- GND	Gnd	⊥
8	- GND	Gnd	⊥

11 - Cinch: Digital Audio - Out

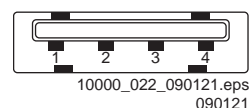
BK	- Coaxial	0.4 - 0.6V _{PP} / 75 W	⊕
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12 - TV ANTENNA - In

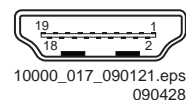
Signal input from an antenna, cable or satellite.

13 - SAT - In








Signal input from an SAT.

14- USB1 2.0**Figure 2-8 USB (type A)**

1	- +5V		⊕
2	- Data (-)		⊕
3	- Data (+)		⊕
4	- Ground	Gnd	⊥

15 - HDMI1 : Digital Video - In, Digital Audio - In/Out**Figure 2-9 HDMI (type A) connector**

1	- D2+	Data channel	⊕
2	- Shield	Gnd	⊥
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⊥
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕
8	- Shield	Gnd	⊥
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⊥
12	- CLK-	Data channel	⊕

13	- Easylink/CEC	Control channel	
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

16 - HDMI2 : Digital Video - In, Digital Audio - In/Out

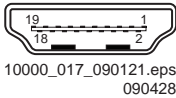





















Figure 2-10 HDMI (type A) connector

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	

4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- Easylink/CEC	Control channel	
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

2.4 Chassis Overview

Refer to [9. Block Diagrams](#) for PWB/CBA locations.


3. Precautions, Notes, and Abbreviation List

Index of this chapter:

- [3.1 Safety Instructions](#)
- [3.2 Warnings](#)
- [3.3 Notes](#)
- [3.4 Abbreviation List](#)

3.1 Safety Instructions


Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:







- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
 1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
 2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

3.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ) . Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

3.3 Notes

3.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground () , or hot ground () , depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with () and without () aerial signal. Measure the voltages in the power supply section both in normal operation () and in stand-by () . These values are indicated by means of the appropriate symbols.

3.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

For the latest spare part overview, consult your Philips Spare Part web portal.

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: <http://www.atyourservice-magazine.com>. Select "Magazine", then go to "Repair downloads". Here you will find information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
 - To reach a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to **avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

3.3.6 Alternative BOM identification

It should be noted that on the European Service website, "Alternative BOM" is referred to as "Design variant".

The **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then

result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number "1" (example: AG1B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B033500001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26 = 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. SN is Lysomice, RJ is Kobierzyce), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.



Figure 3-1 Serial number (example)

3.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3.4 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV),
DNR	Digital Noise Reduction: noise

6 = play 16 : 9 format, 12 = play 4 : 3 format

AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See "E-DDC"
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion
DFU	Directions For Use: owner's manual
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion reduction feature of the set

DRAM	Dynamic RAM		a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
DRM	Digital Rights Management		
DSP	Digital Signal Processing		
DST	Dealer Service Tool: special remote control designed for service technicians	iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
		LS	Last Status; The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394		
DVB-C	Digital Video Broadcast - Cable	LATAM	Latin America
DVB-T	Digital Video Broadcast - Terrestrial	LCD	Liquid Crystal Display
DVD	Digital Versatile Disc	LED	Light Emitting Diode
DVI(-d)	Digital Visual Interface (d= digital only)	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information from the display.	LPL	LG.Philips LCD (supplier)
		LS	Loudspeaker
		LVDS	Low Voltage Differential Signalling
EDID	Extended Display Identification Data (VESA standard)	Mbps	Mega bits per second
		M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
EEPROM	Electrically Erasable and Programmable Read Only Memory	MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
EMI	Electro Magnetic Interference		
EPG	Electronic Program Guide		
EPLD	Erasable Programmable Logic Device		
EU	Europe		
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)		
FDS	Full Dual Screen (same as FDW)	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
FDW	Full Dual Window (same as FDS)		
FLASH	FLASH memory		
FM	Field Memory or Frequency Modulation	MOP	Matrix Output Processor
		MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
FPGA	Field-Programmable Gate Array		
FTV	Flat TeleVision	MPEG	Motion Pictures Experts Group
Gb/s	Giga bits per second	MPIF	Multi Platform InterFace
G-TXT	Green TeleteXT	MUTE	MUTE Line
H	H_sync to the module	MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
HD	High Definition		
HDD	Hard Disk Drive	NC	Not Connected
HDCP	High-bandwidth Digital Content Protection: A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP "software key" decoding.	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
		NTC	Negative Temperature Coefficient, non-linear resistor
		NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
		NVM	Non-Volatile Memory: IC containing TV related data such as alignments
HDMI	High Definition Multimedia Interface		
HP	HeadPhone	O/C	Open Circuit
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	OSD	On Screen Display
		OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
I ² C	Inter IC bus		
I ² D	Inter IC Data bus		
I ² S	Inter IC Sound bus		
IF	Intermediate Frequency	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
IR	Infra Red		
IRQ	Interrupt Request	P50	Project 50: communication protocol between TV and peripherals
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video.	PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
	Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has	PCB	Printed Circuit Board (same as "PWB")
		PCM	Pulse Code Modulation
		PDP	Plasma Display Panel

PFC	Power Factor Corrector (or Pre-conditioner)	SXGA	1280 × 1024
PIP	Picture In Picture	TFT	Thin Film Transistor
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	THD	Total Harmonic Distortion
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)	TMD5	Transmission Minimized Differential Signalling
POR	Power On Reset, signal to reset the uP	TS	Transport Stream
PSDL	Power Supply for Direct view LED backlight with 2D-dimming	TXT	TeleteXT
PSL	Power Supply with integrated LED drivers	TXT-DW	Dual Window with TeleteXT
PSLS	Power Supply with integrated LED drivers with added Scanning functionality	UI	User Interface
PTC	Positive Temperature Coefficient, non-linear resistor	uP	Microprocessor
PWB	Printed Wiring Board (same as "PCB")	UXGA	1600 × 1200 (4:3)
PWM	Pulse Width Modulation	V	V-sync to the module
QRC	Quasi Resonant Converter	VESA	Video Electronics Standards Association
QTNR	Quality Temporal Noise Reduction	VGA	640 × 480 (4:3)
QVCP	Quality Video Composition Processor	VL	Variable Level out: processed audio output toward external amplifier
RAM	Random Access Memory	VSB	Vestigial Side Band; modulation method
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
RC	Remote Control	WXGA	1280 × 768 (15:9)
RC5 / RC6	Signal protocol from the remote control receiver	XTAL	Quartz crystal
RESET	RESET signal	XGA	1024 × 768 (4:3)
ROM	Read Only Memory	Y	Luminance signal
RSDS	Reduced Swing Differential Signalling data interface	Y/C	Luminance (Y) and Chrominance (C) signal
R-TXT	Red TeleteXT	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
SAM	Service Alignment Mode	YUV	Component video
S/C	Short Circuit		
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs		
SCL	Serial Clock I ² C		
SCL-F	CLock Signal on Fast I ² C bus		
SD	Standard Definition		
SDA	Serial Data I ² C		
SDA-F	DAta Signal on Fast I ² C bus		
SDI	Serial Digital Interface, see "ITU-656"		
SDRAM	Synchronous DRAM		
SECAM	SEquence Couleur Avec Mémoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz		
SIF	Sound Intermediate Frequency		
SMPS	Switched Mode Power Supply		
SoC	System on Chip		
SOG	Sync On Green		
SOPS	Self Oscillating Power Supply		
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard		
S/PDIF	Sony Philips Digital InterFace		
SRAM	Static RAM		
SRP	Service Reference Protocol		
SSB	Small Signal Board		
SSC	Spread Spectrum Clocking, used to reduce the effects of EMI		
STB	Set Top Box		
STBY	STand-BY		
SVGA	800 × 600 (4:3)		
SVHS	Super Video Home System		
SW	Software		
SWAN	Spatial temporal Weighted Averaging Noise reduction		

4. Mechanical Instructions

Index of this chapter:

4.1 Cable Dressing

4.2 Service Positions

4.3 Assembly/Panel Removal (for 7101 & 6521 series)

4.4 Assembly/Panel Removal (for 7181 series)

4.5 Assembly/Panel Removal (for 65x1 series)

4.6 Assembly/Panel Removal (for 6401 series)

4.7 Assembly/Panel Removal (for 7601 series)

4.8 Set Re-assembly

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing

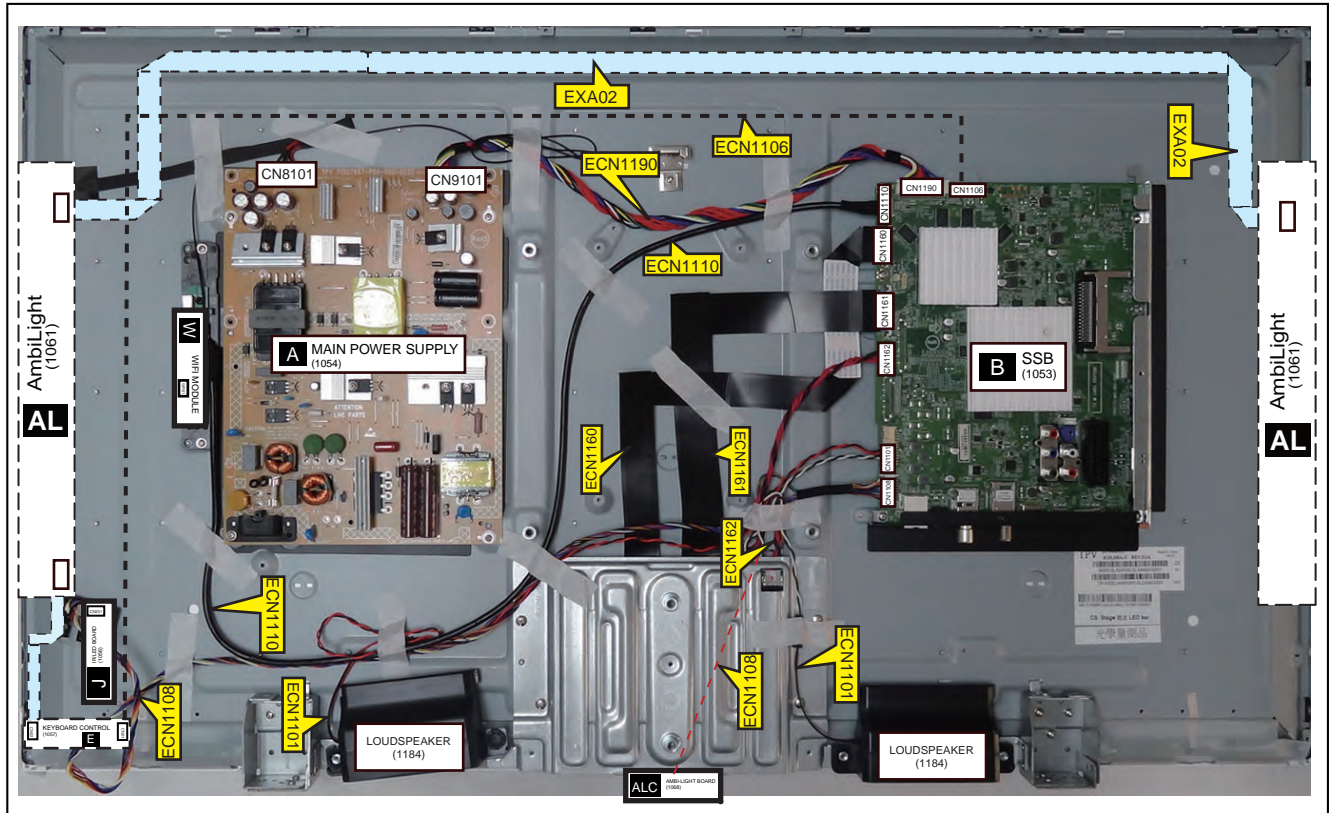
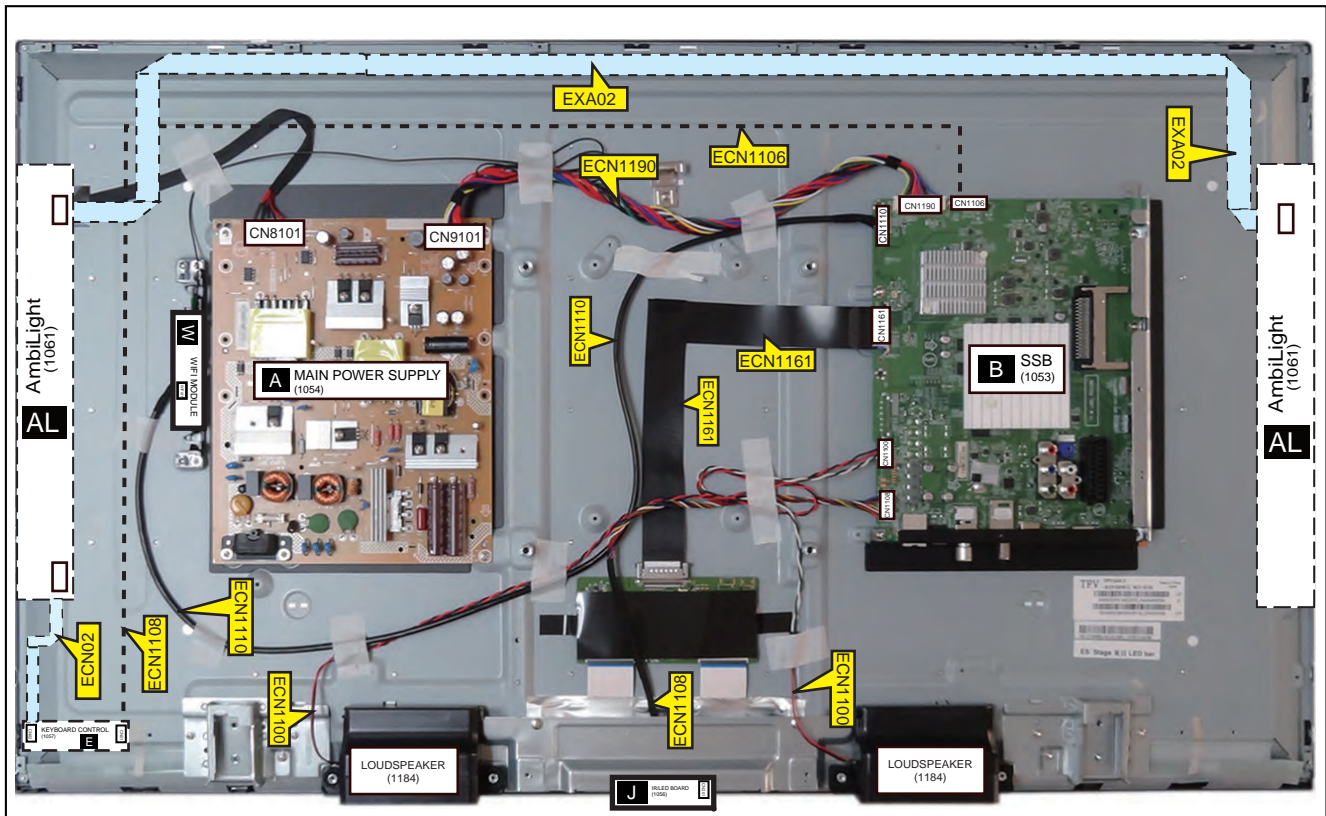


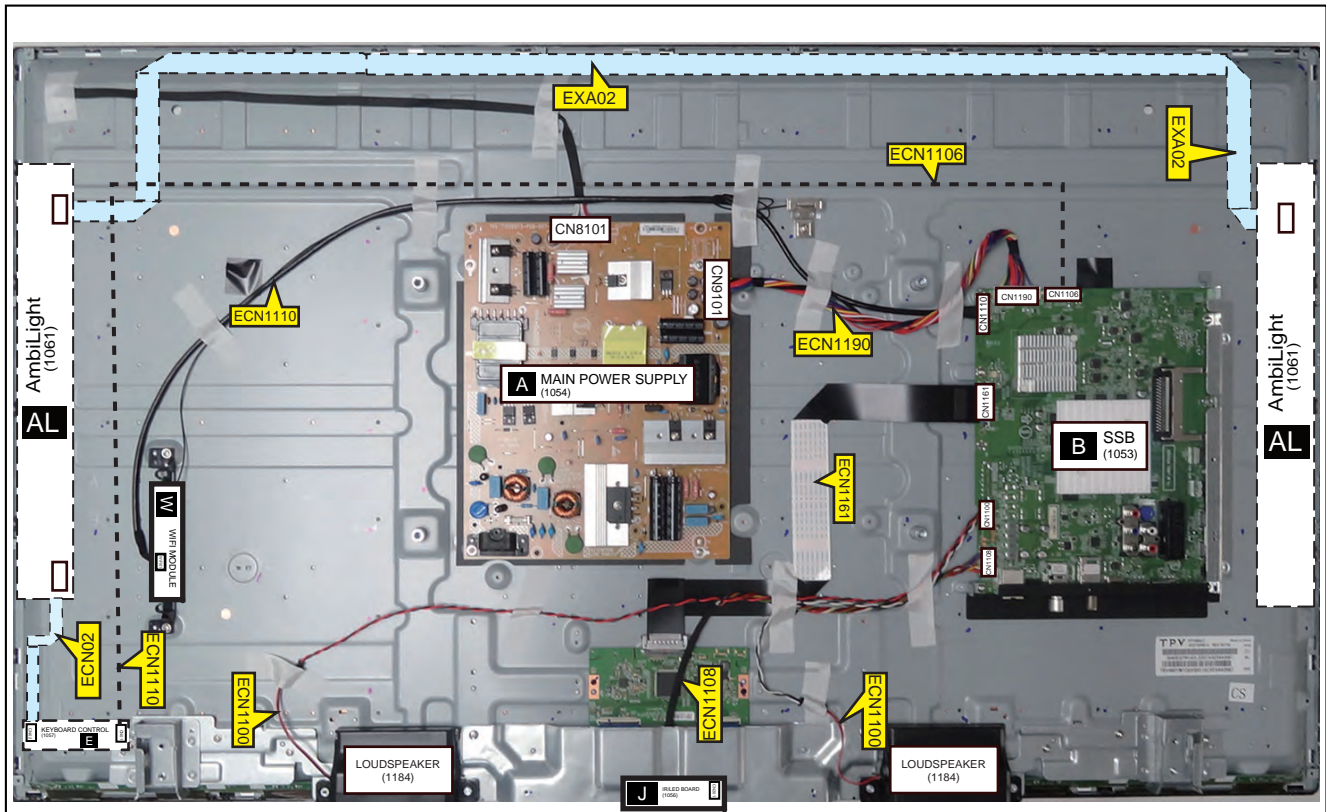
Figure 4-1 Cable dressing (43" 6501/6551 series)

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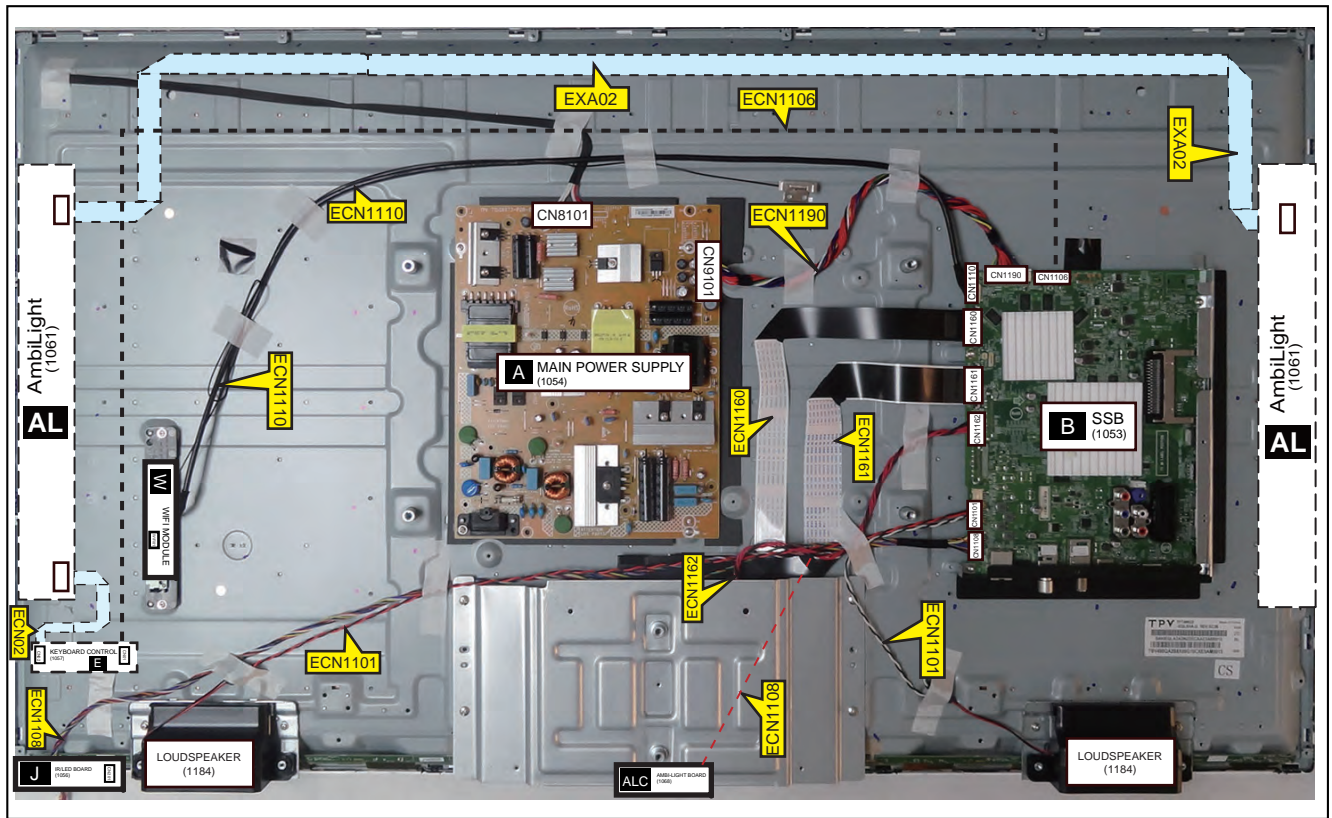
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Figure 4-2 Cable dressing (43" 6401 series)



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Figure 4-3 Cable dressing (49" 6401 series)



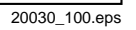


Figure 4-6 Cable dressing (49" 71x1 series)

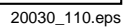
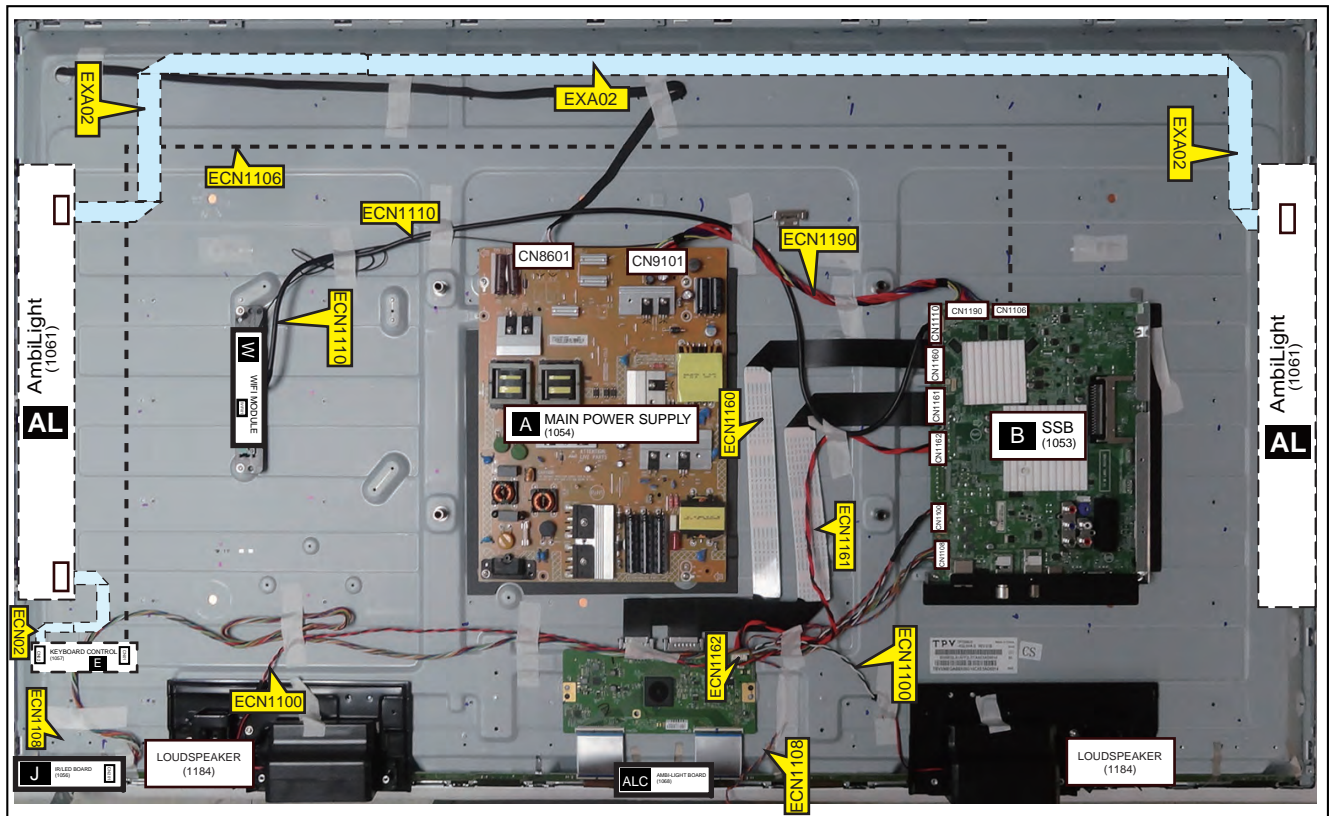
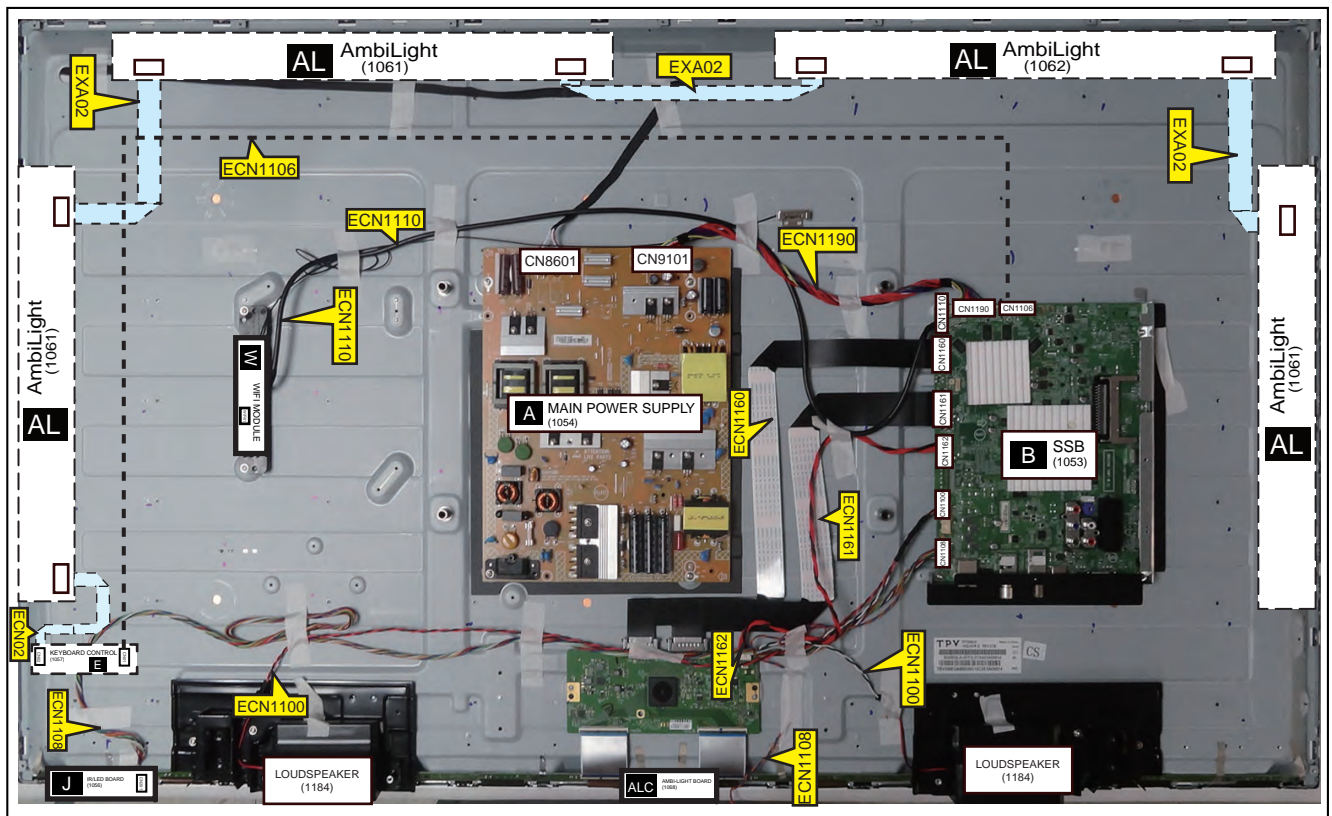


Figure 4-7 Cable dressing (55" 6401 series)



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Figure 4-8 Cable dressing (55" 6501/6551 series)



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Figure 4-9 Cable dressing (55" 6561/6581 series)

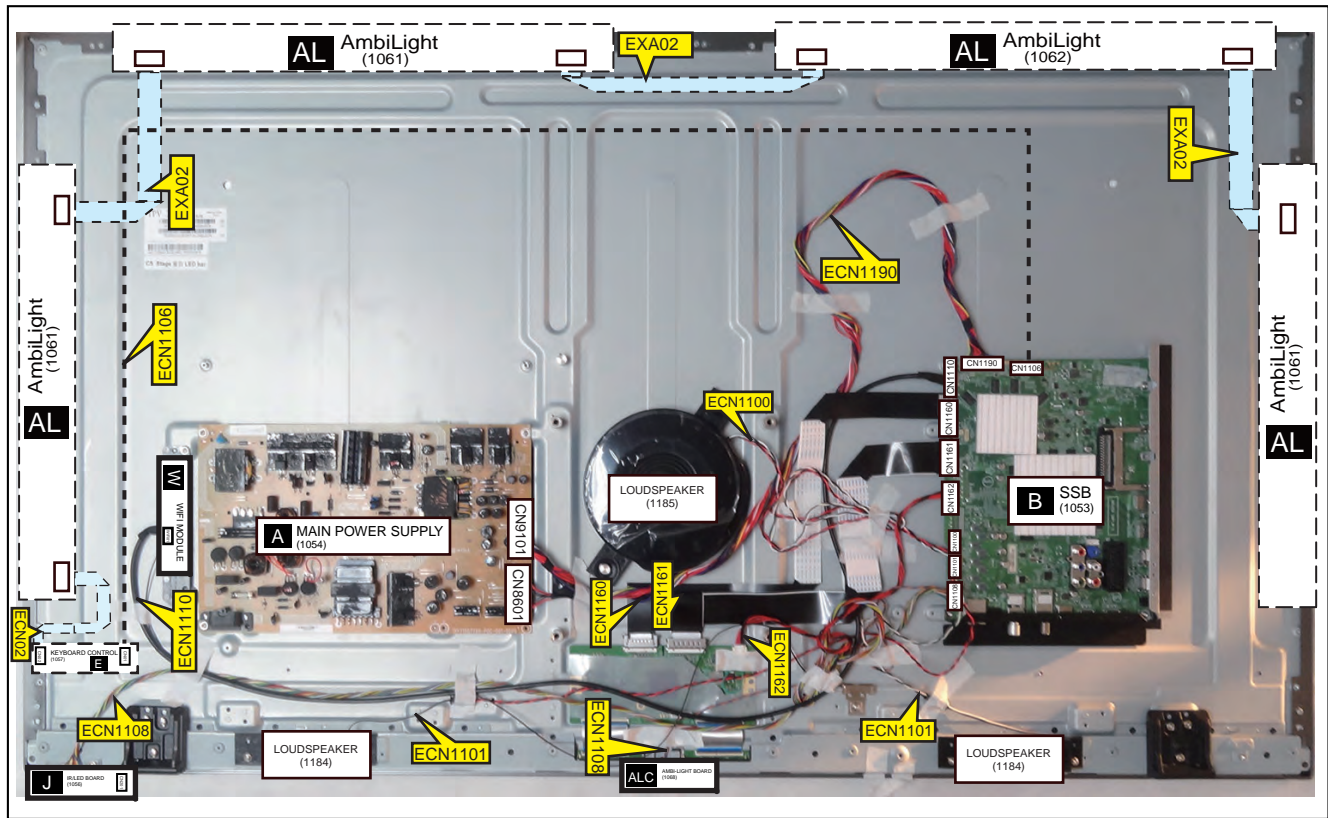


Figure 4-10 Cable dressing (55" 7101 series)

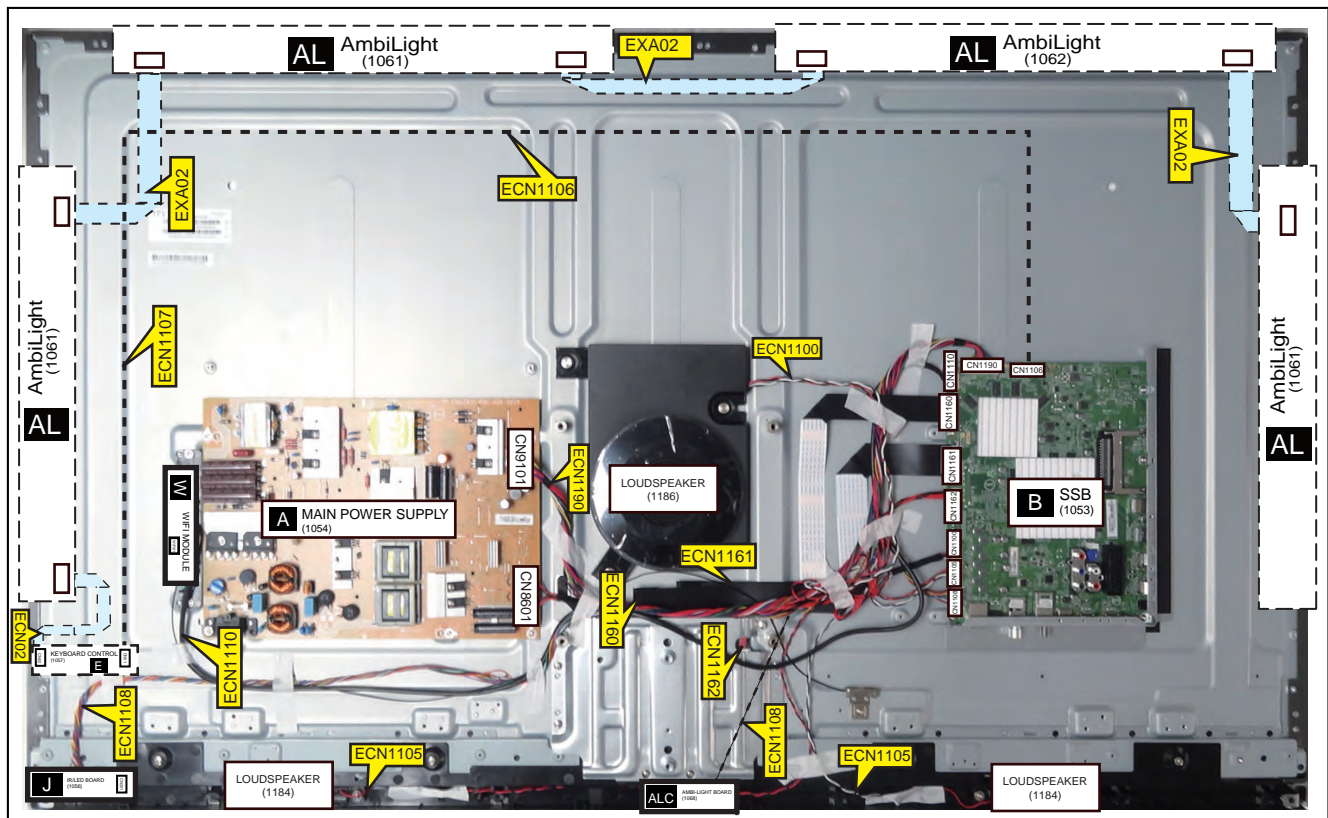
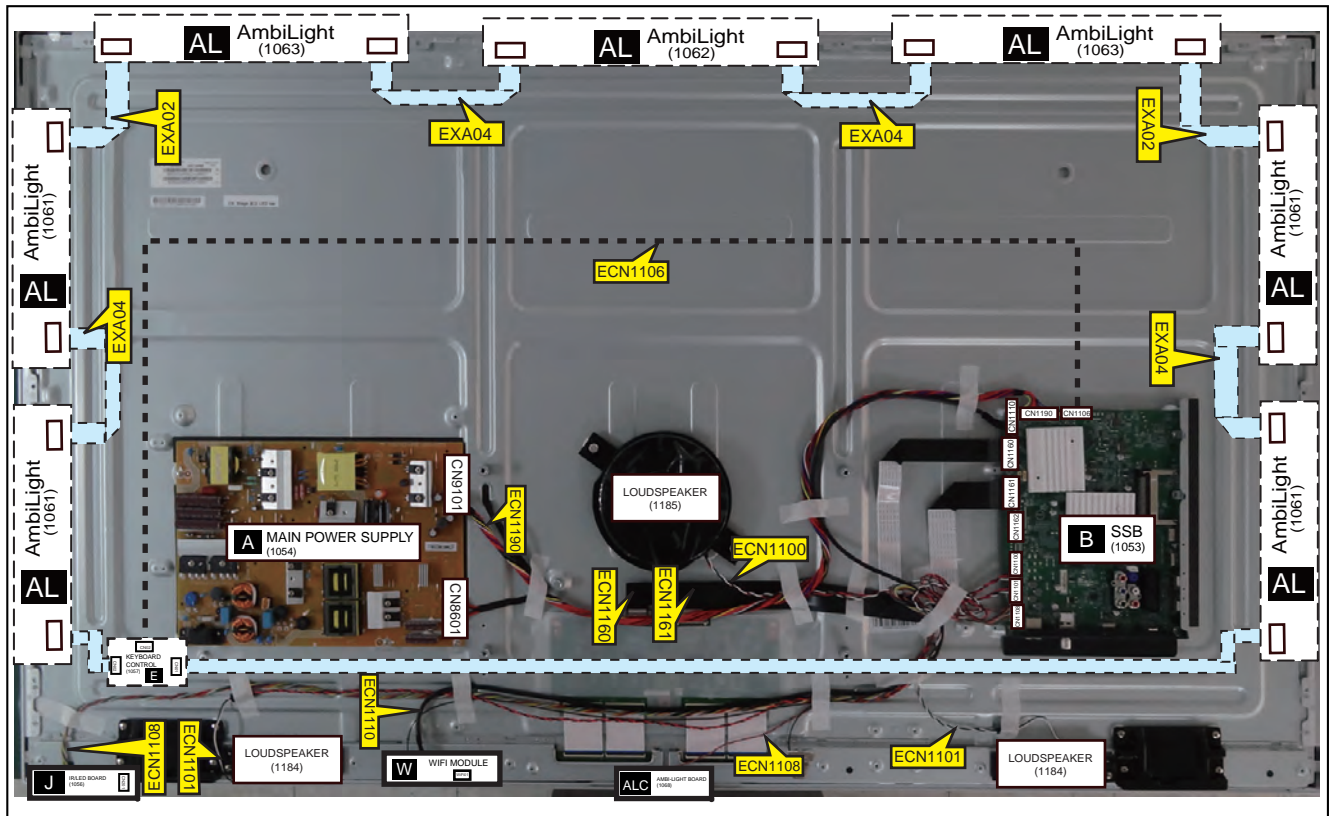
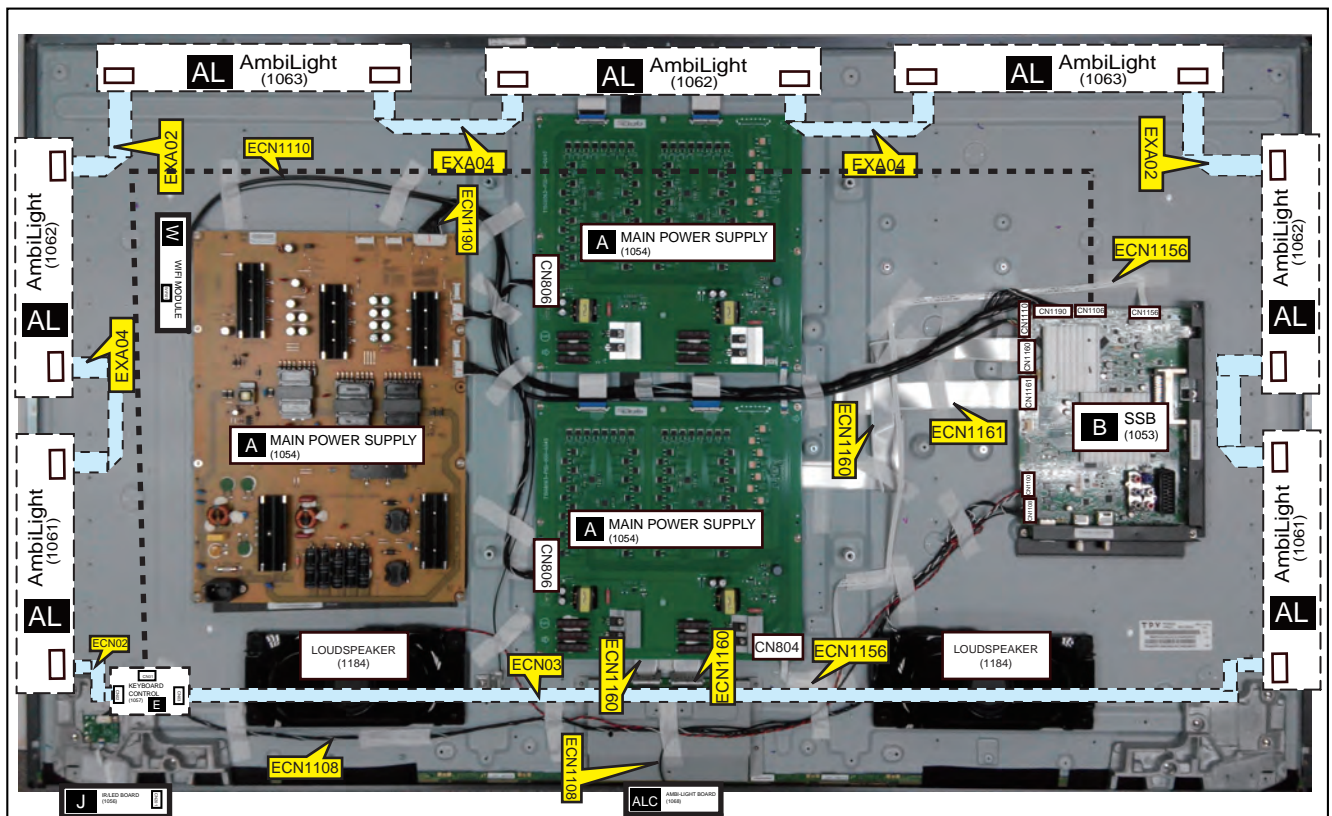


Figure 4-11 Cable dressing (55" 7181 series)



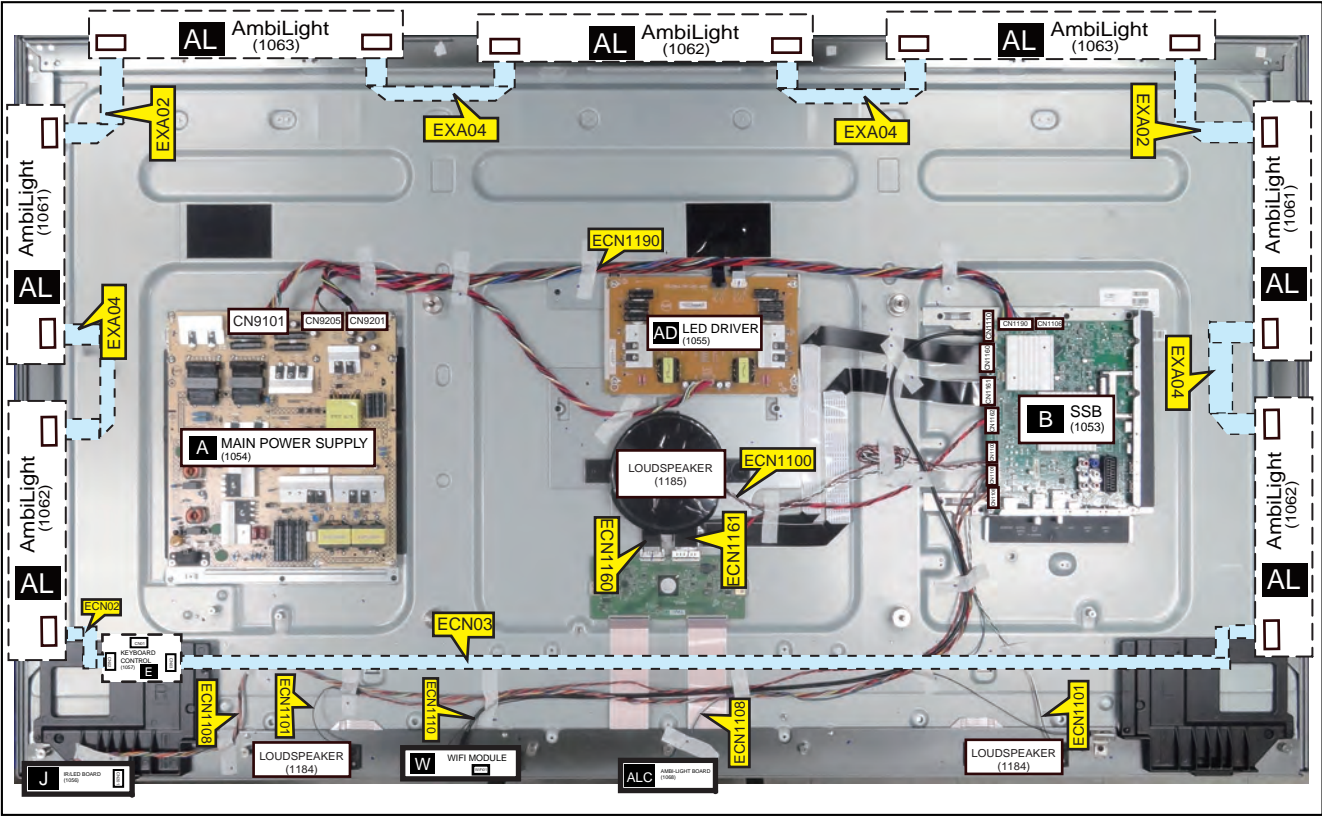
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Figure 4-12 Cable dressing (65" 6521/7101 series)



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Figure 4-13 Cable dressing (65" 7601 series)



20150_101.eps

Figure 4-14 Cable dressing (75" 7101 series)

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display!
Ensure that ESD safe measures are taken.

4.3 Assembly/Panel Removal (for 7101 & 6521 series)

Instructions below apply to the 49PUS7101/12, but will be similar for other 49"/55"/65"/75"PUS7101 and 65"PUS6521 series models.

4.3.1 Stand

Refer to [Figure 4-15](#) for details.

1. Remove the fixation screws [1] that secure the stand bracket. Refer to [Figure 4-15](#) for details.
2. Take the stand bracket out from the set.



20030_111.eps

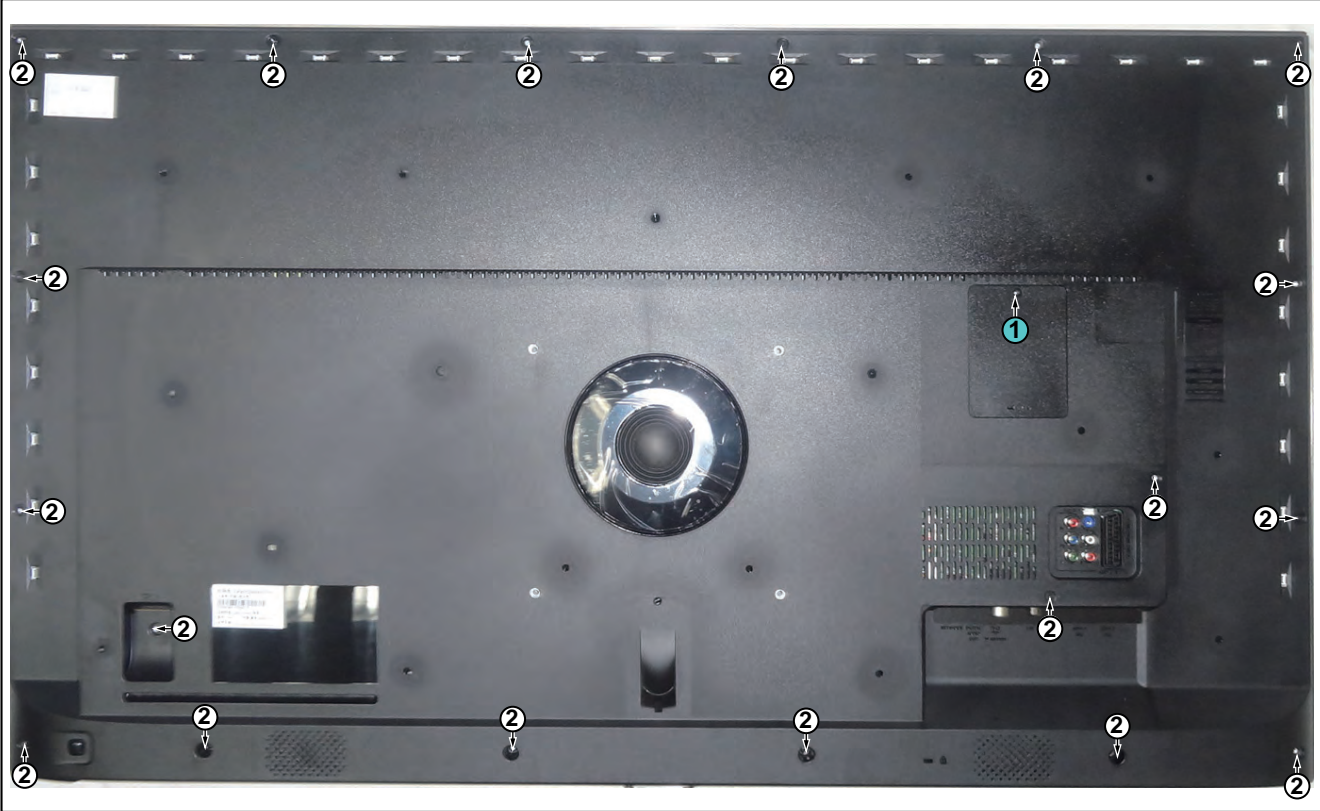
Figure 4-15 Stand removal

4.3.2 Rear Cover

Refer to [Figure 4-16](#) & [Figure 4-17](#) for details.

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove the fixation screws [1] and [2] that secure the rear cover. Refer to [Figure 4-16](#) for details.
2. Unplug the connector [3] from SSB. Refer to [Figure 4-17](#) for details.
3. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.



20030_112.eps

Figure 4-16 Rear cover removal[1]



20030_113.eps

Figure 4-17 Rear cover removal[2]

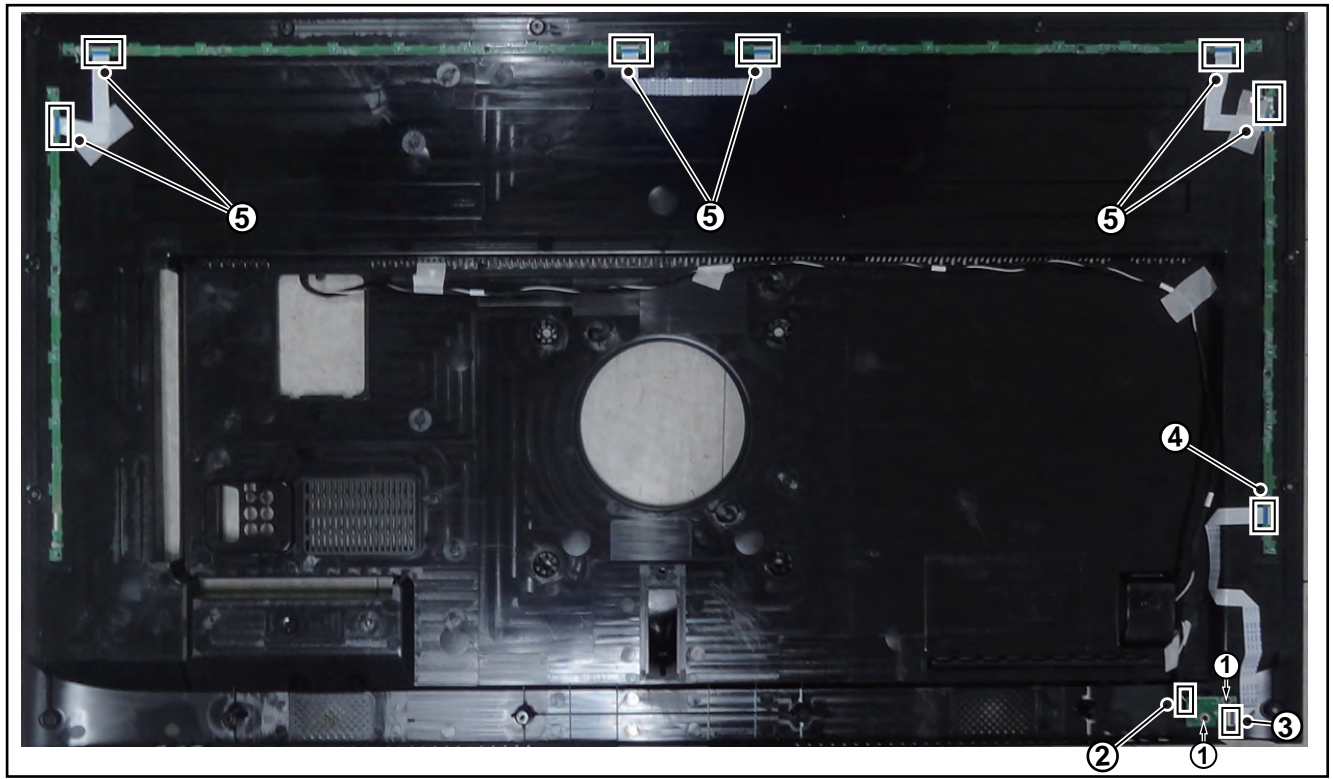
4.3.3 AmbiLight Panel

Refer to [Figure 4-18](#) for details.

1. Gently release the clamps and unplug the connectors [5] that secure the ambilight panels. Release the clips from the

FFC connector that connect with the Keyboard control panel [4].

2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the Ambilight panel from the rear cover.



20030_114.eps

Figure 4-18 Ambilight and Keyboard removal

4.3.4 Keyboard Control Unit

Refer to [Figure 4-18](#) for details.

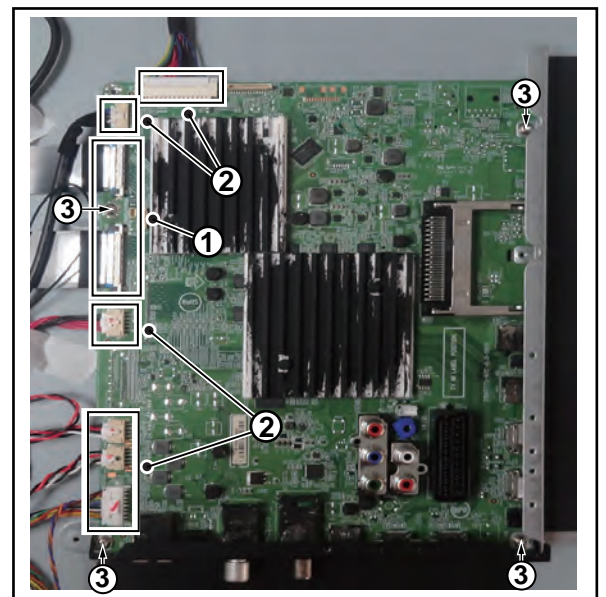
1. Release the connector [2] from the SSB Board, then release the connector [3] from the Ambilight panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.3.5 Small Signal Board (SSB)

Refer to [Figure 4-19](#) for details.

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors! Unplug the cable/flat foils connector.
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. Take out the SSB with I/O bracket.
5. The SSB can now be shifted away from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-19](#) for details.



20030_115.eps

Figure 4-19 SSB removal

4.3.6 IR/LED Board

Refer to [Figure 4-20](#) for details.

1. Remove the fixation screw [1] from the bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the IR/LED board. The IR/LED Board can now be lifted and taken out from the cover.

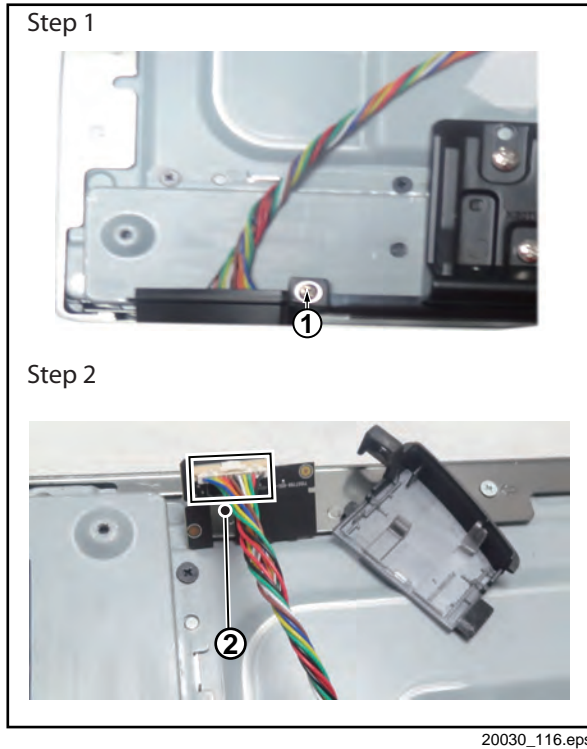


Figure 4-20 IR/LED Board removal

4.3.7 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.3.8 Speakers

1. Gently release the tapes that secure the speaker cables.
 2. Unplug the speaker connector from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

4.3.9 WIFI module

1. Unplug the connector from the SSB.
 2. Remove fixation screw that secure the WIFI module, gently remove the module from the set.
- When defective, replace the whole unit.

4.3.10 LED Logo Board

Refer to [Figure 4-21](#) for details.

1. Remove the fixation screws [1] from the bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the LED Logo board. The LED Logo board can now be lifted and taken out from the cover.

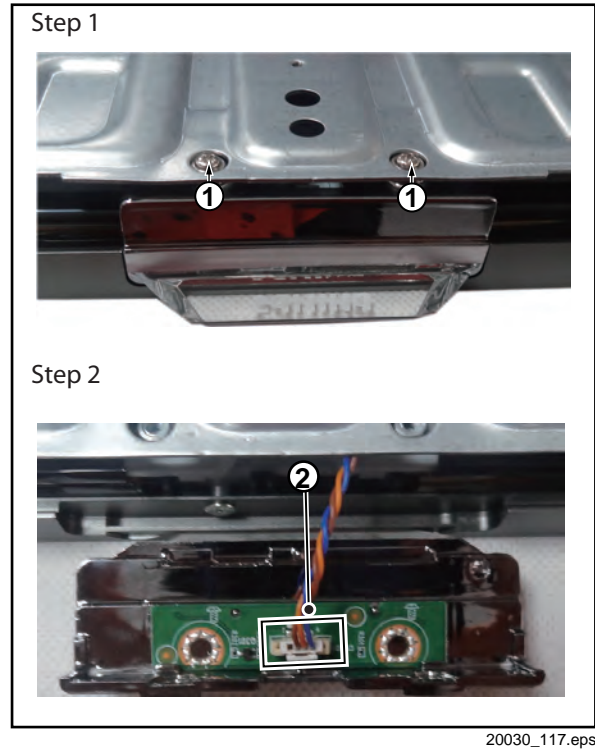


Figure 4-21 LED Logo Board removal

4.3.11 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR/LED as described earlier.
 6. Remove the WIFI module as earlier.
 7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 8. Remove all other metal parts not belonging to the panel.
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.4 Assembly/Panel Removal (for 7181 series)

Instructions below apply to the 49PUS7181/12, but will be similar for other 49"/55"7181 series models.

4.4.1 Stand

Refer to [Figure 4-22](#) and [Figure 4-23](#) for details.

1. Remove the screws [1] that secure the black plastic and, gently remove the black plastic casing that covers the stand bracket, refer to [Figure 4-22](#).
2. Remove the Allen screws [2] that secure the stand bracket and, pull out the stand downwards from the set, refer to [Figure 4-23](#).



20030_118.eps

Figure 4-22 Stand removal[1]



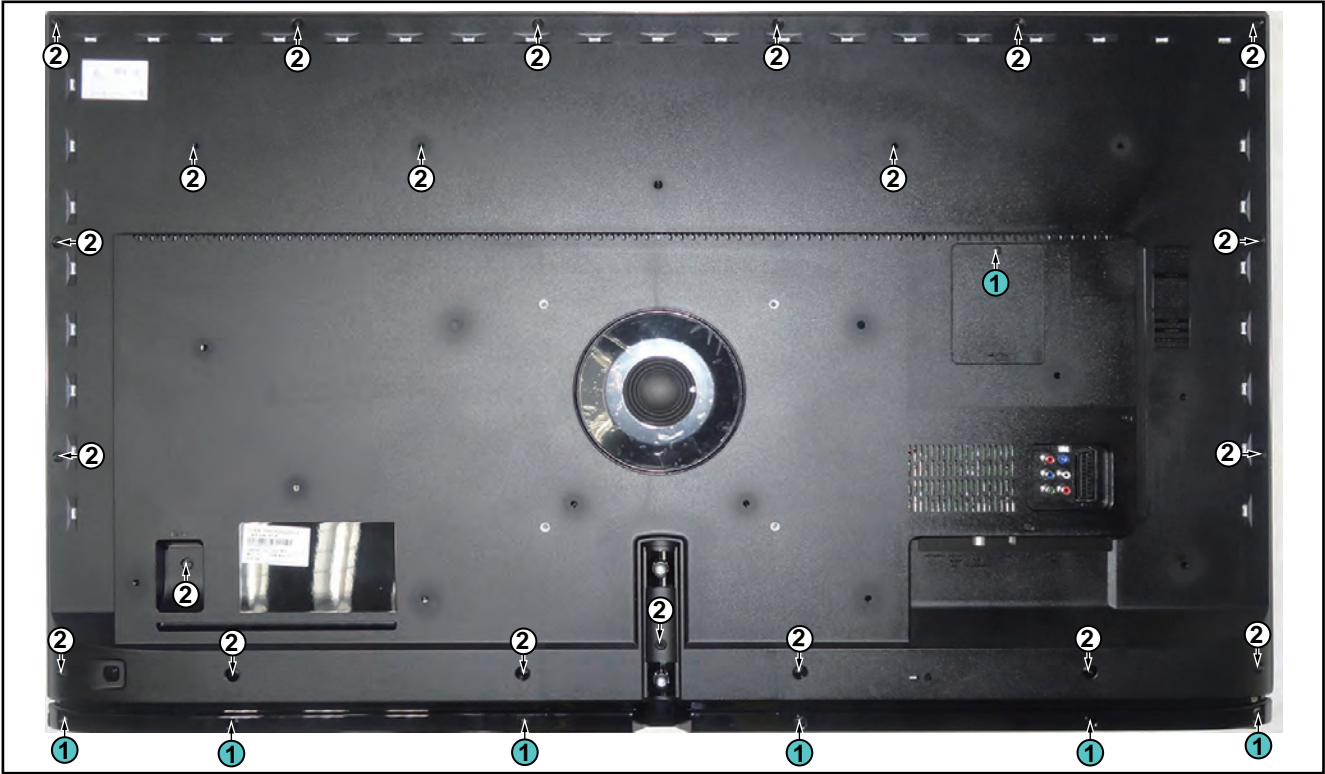
20030_119.eps

Figure 4-23 Stand removal[2]

4.4.2 Rear Cover

Refer to [Figure 4-24](#) and [Figure 4-25](#) for details.
Warning: Disconnect the mains power cord before removing the rear cover.
1. Remove the fixation screws [1,2] that secure the rear cover.

2. Unplug the connector [3] from SSB. Refer to [Figure 4-25](#) for details.
3. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.



20030_120.eps

Figure 4-24 Rear cover removal[1]



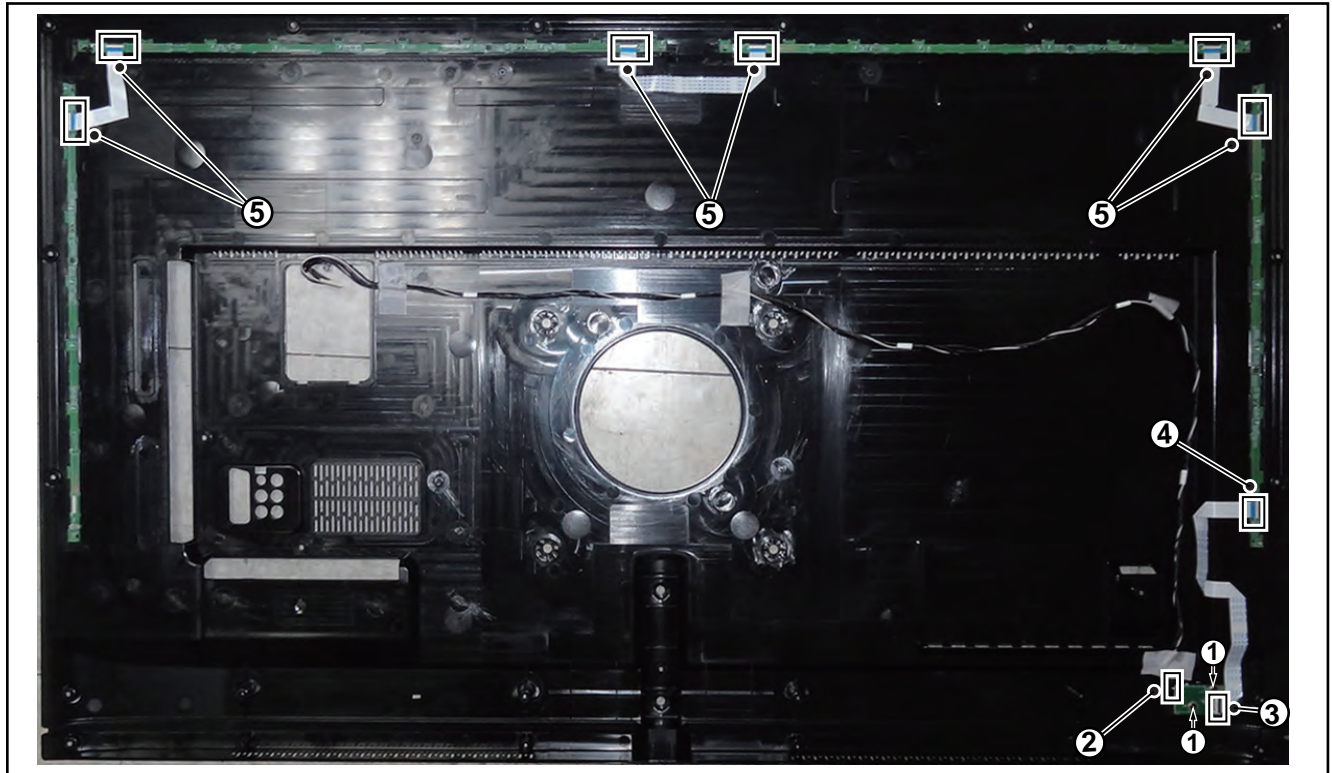
20030_121.eps

Figure 4-25 Rear cover removal[2]

4.4.3 AmbiLight Panel

Refer to [Figure 4-26](#) for details.

1. Gently release the clamps and unplug the two connectors [5] that secure the ambilight panels. Release the clips from the FFC connector that connect with the keyboard [4].
2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the ambilight panel from the rear cover.



20030_123.eps

Figure 4-26 Ambilight and Keyboard removal

4.4.4 Keyboard Control Unit

Refer to [Figure 4-26](#) for details.

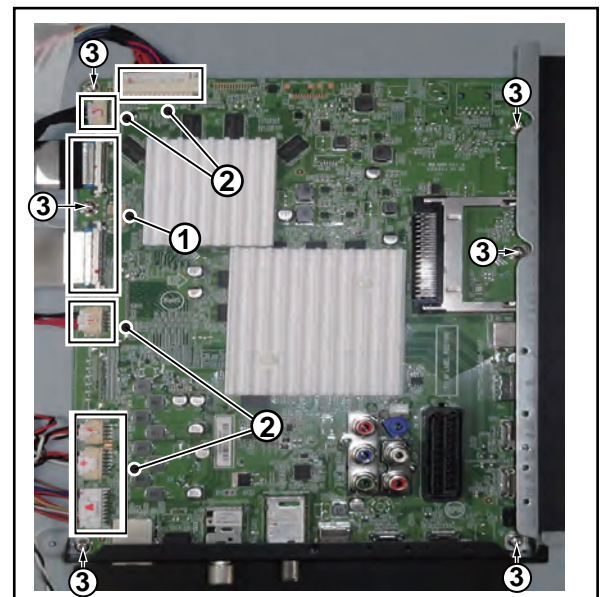
1. Release the connector [2] from the FRC Board, then release the connectors [3] from the keyboard control panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.4.5 Small Signal Board (SSB)

Refer to [Figure 4-27](#) for details.

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors!
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-27](#) for details.



20030_122.eps

Figure 4-27 SSB removal

4.4.6 IR/LED Board

Refer to [Figure 4-28](#) for details.

1. Remove the fixation screws [1] from the stand bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the IR/LED board. The IR/LED Board can now be lifted and taken out from the cover.

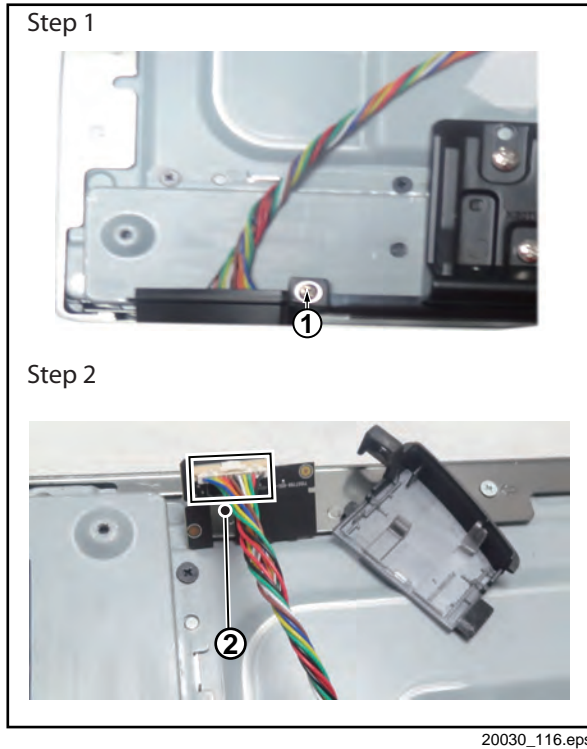


Figure 4-28 IR/LED Board removal

4.4.7 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.4.8 Speakers

1. Gently release the tapes that secures the speaker cables.
 2. Unplug the speaker connectors from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

4.4.9 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR/LED as described earlier.
 6. Remove the WIFI module as earlier.
 7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 8. Remove all other metal parts not belonging to the panel.
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.5 Assembly/Panel Removal (for 65x1 series)

Instructions below apply to the 49PUS6551/12, but will be similar for other 65x1 series models.

4.5.1 IR/LED Board

Refer to [Figure 4-29](#) and [Figure 4-30](#) for details.

Caution: IR/LED Board must be removed before opening of Back cover.

1. Remove the fixation screws [1] from the stand bracket.
2. The IR/LED Board catch on the Back cover, need to slide it just like sliding out the battery door in the Remote Control. Be kindly noted, the arrow [2] indicates the direction to slide out the IR/LED module. Refer to [Figure 4-29](#) for details.
3. After carefully pull out the assy from the set, then unplug the connector [3] from the IR/LED board. The IR/LED Board can now be lifted and taken out from the cover. Refer to [Figure 4-30](#) for details.

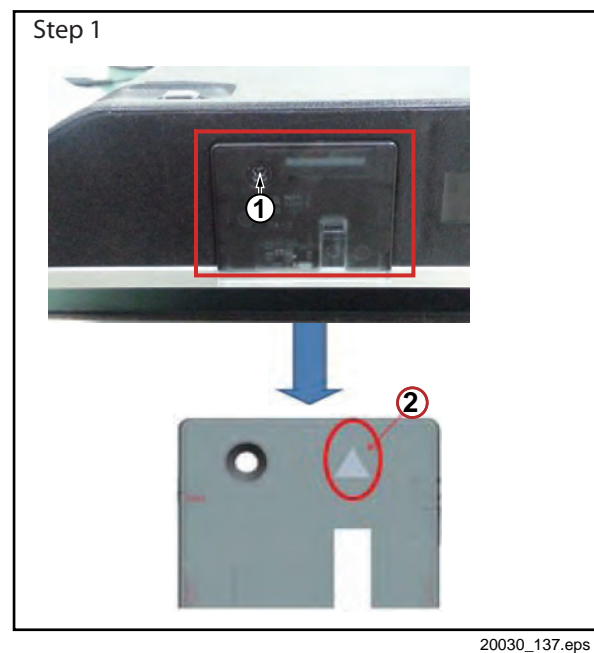


Figure 4-29 IR/LED Board removal[1]

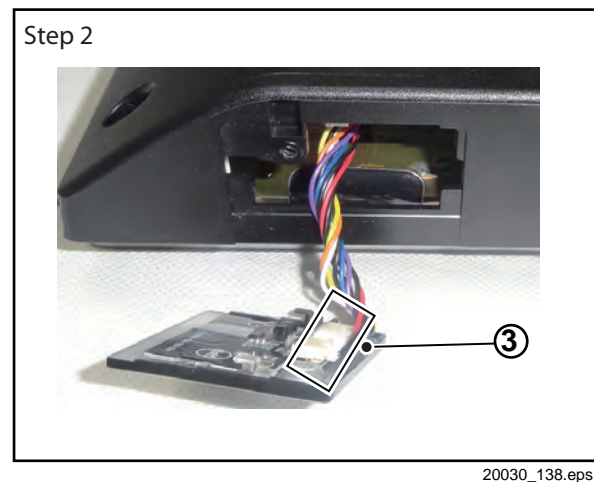


Figure 4-30 IR/LED Board removal[2]

4.5.2 Stand

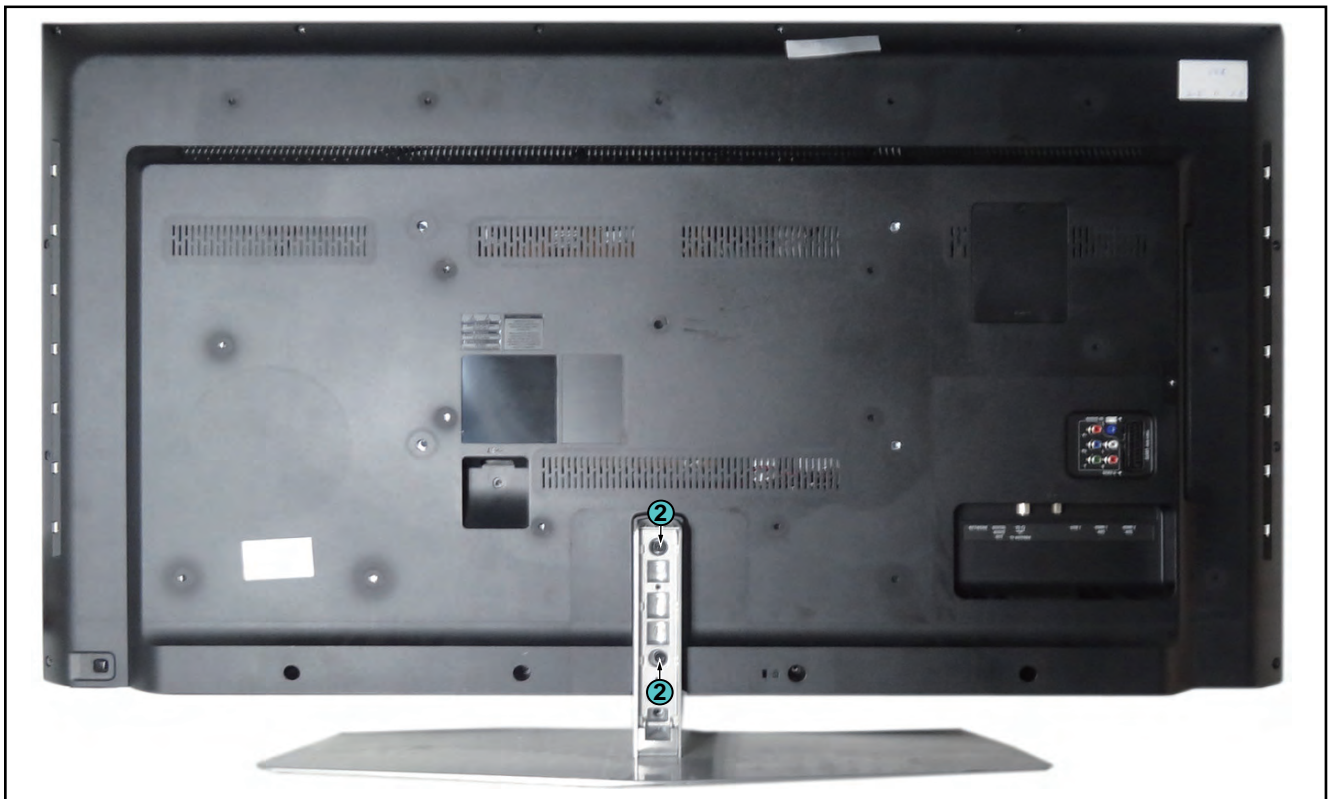
Refer to [Figure 4-31](#) and [Figure 4-32](#) for details.

1. Remove the screws [1] that secure the black plastic and, gently remove the black plastic casing that covers the stand bracket, refer to [Figure 4-31](#).
2. Remove the Allen screws [2] that secure the stand bracket and, pull out the stand downwards from the set, refer to [Figure 4-32](#).



20030_130.eps

Figure 4-31 Stand removal[1]



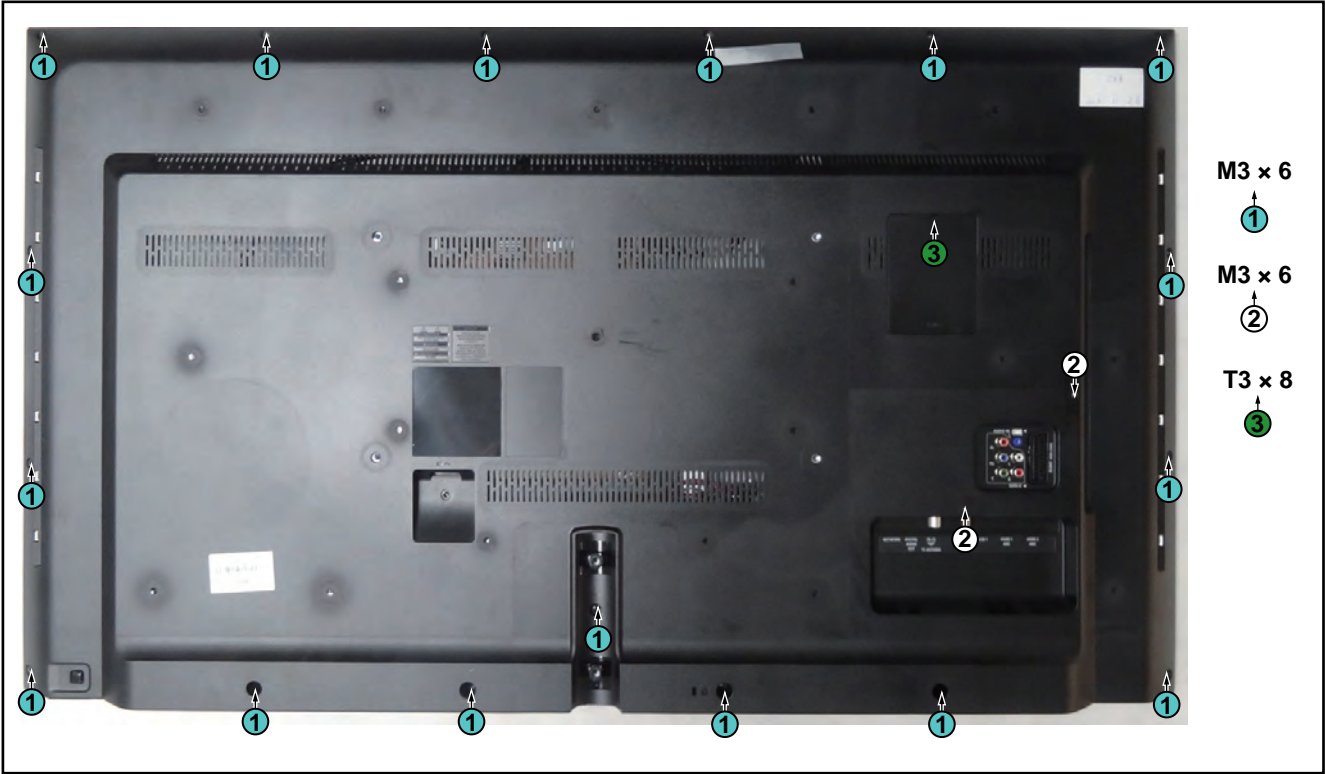
20030_131.eps

Figure 4-32 Stand removal[2]

4.5.3 Rear Cover

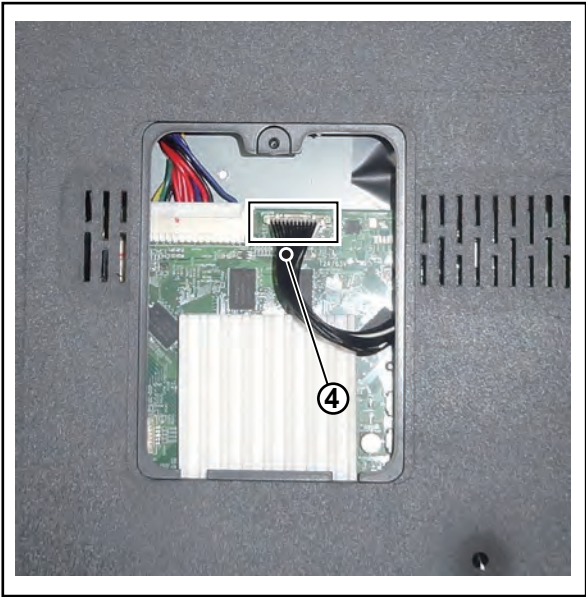
Refer to [Figure 4-33](#) for details.
Warning: Disconnect the mains power cord before removing the rear cover.
1. Remove the fixation screws [1,2,3] that secure the rear cover.

2. Unplug the connector [4] from SSB. Refer to [Figure 4-25](#) for details.
3. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.



20030_132.eps

Figure 4-33 Rear cover removal[1]



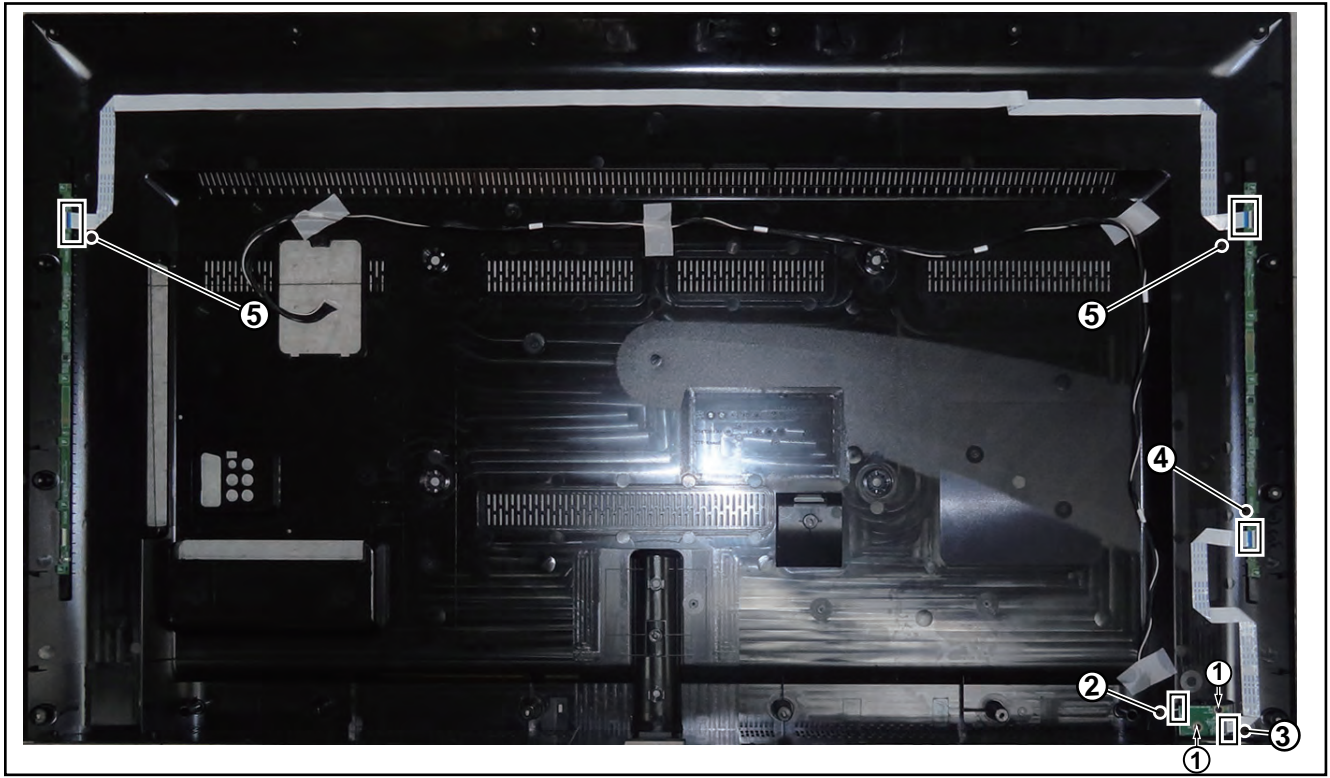
20030_133.eps

Figure 4-34 Rear cover removal[2]

4.5.4 AmbiLight Panel

Refer to [Figure 4-35](#) for details.

1. Gently release the clamps and unplug the two connectors [5] that secure the ambilight panels. Release the clips from the FFC connector that connect with the keyboard [4].
2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the ambilight panel from the rear cover.



20030_134.eps

Figure 4-35 Ambilight and Keyboard removal

4.5.5 Keyboard Control Unit

Refer to [Figure 4-35](#) for details.

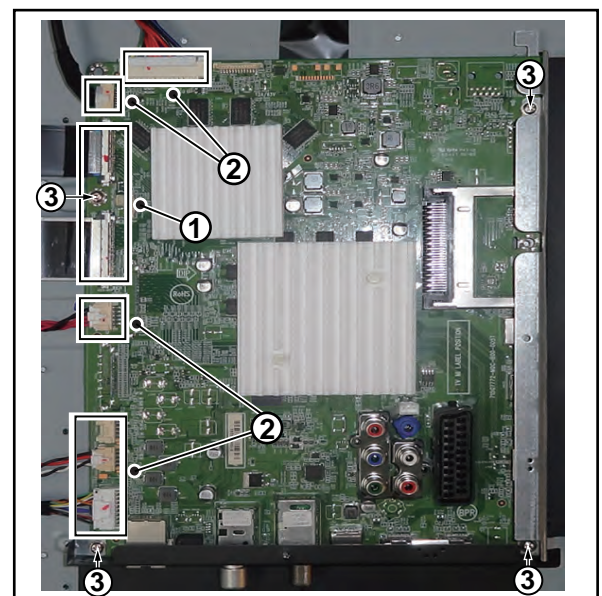
1. Release the connector [2] from the FRC Board, then release the connectors [3] from the keyboard control panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.5.6 Small Signal Board (SSB)

Refer to [Figure 4-36](#) for details.

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors!
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-36](#) for details.



20030_135.eps

Figure 4-36 SSB removal

4.5.7 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.5.8 LED Logo Board

Refer to [Figure 4-37](#) for details.

1. Remove the fixation screws [1] from the bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the LED Logo board. The LED Logo board can now be lifted and taken out from the cover.

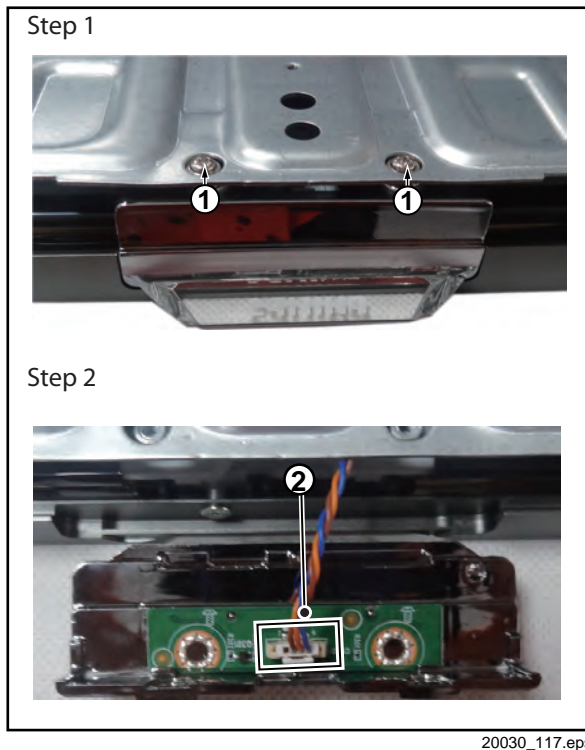


Figure 4-37 LED Logo Board removal

4.5.9 Speakers

1. Gently release the tapes that secures the speaker cables.
 2. Unplug the speaker connectors from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

4.5.10 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR/LED as described earlier.
 6. Remove the WIFI module as earlier.
 7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 8. Remove all other metal parts not belonging to the panel.
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.6 Assembly/Panel Removal (for 6401 series)

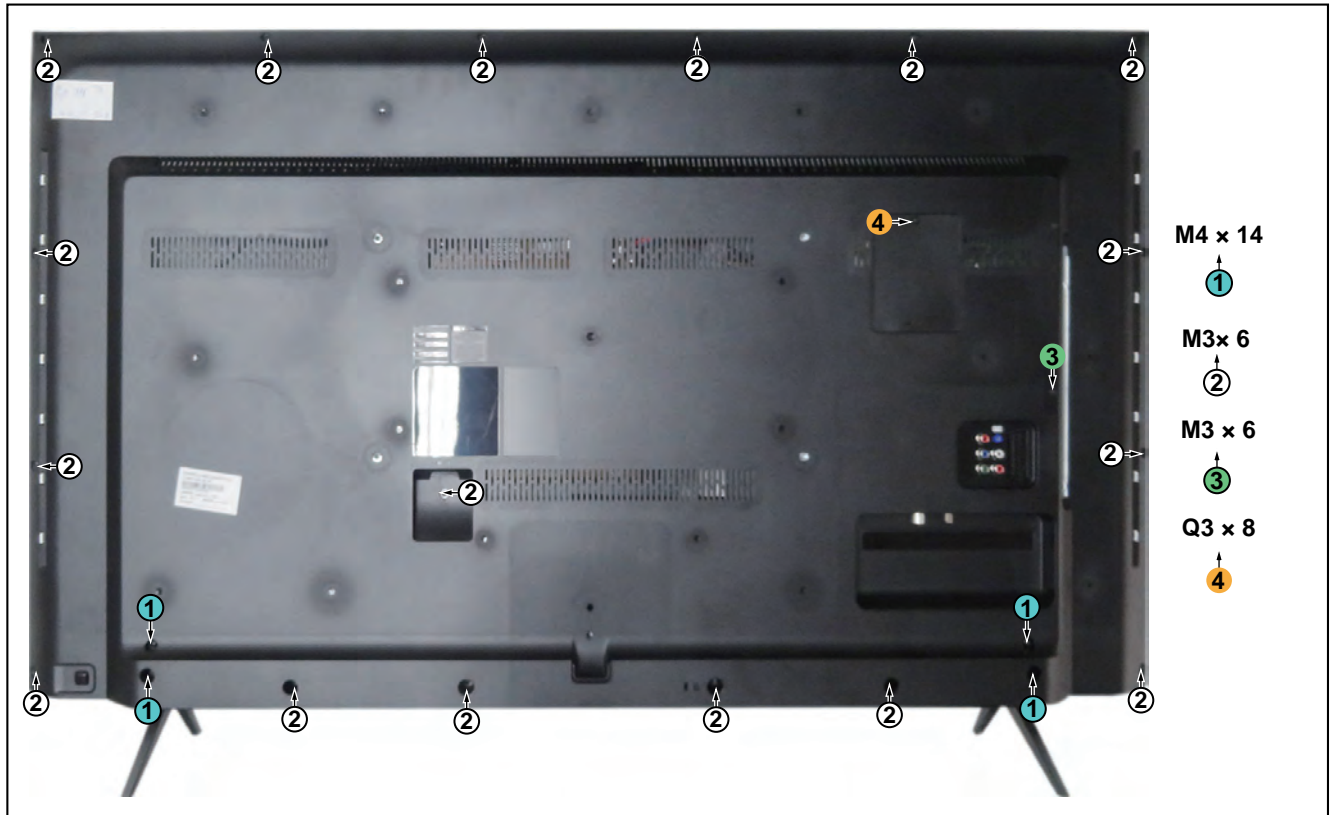
Instructions below apply to the 49PFS6401/12, but will be similar for other 43"/49"/55"Pxx6401 models.

4.6.1 Rear Cover

Refer to [Figure 4-38](#) and [Figure 4-39](#) for details.

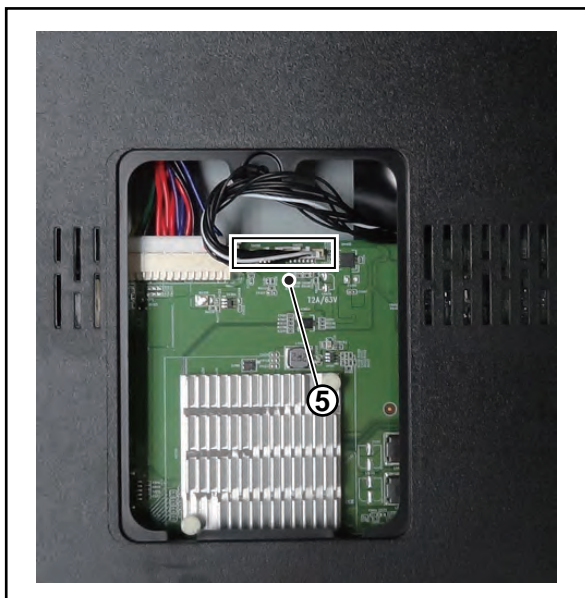
Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove fixation screws [1] that secure the base assy, pull out the base assy from the set. Refer to [Figure 4-38](#) for details.
2. Remove the fixation screws [2], [3] and [4] that secure the rear cover. Refer to [Figure 4-38](#) for details.
3. Unplug the connector [5] from SSB. Refer to [Figure 4-39](#) for details.
4. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.



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Figure 4-38 Rear cover removal[1]



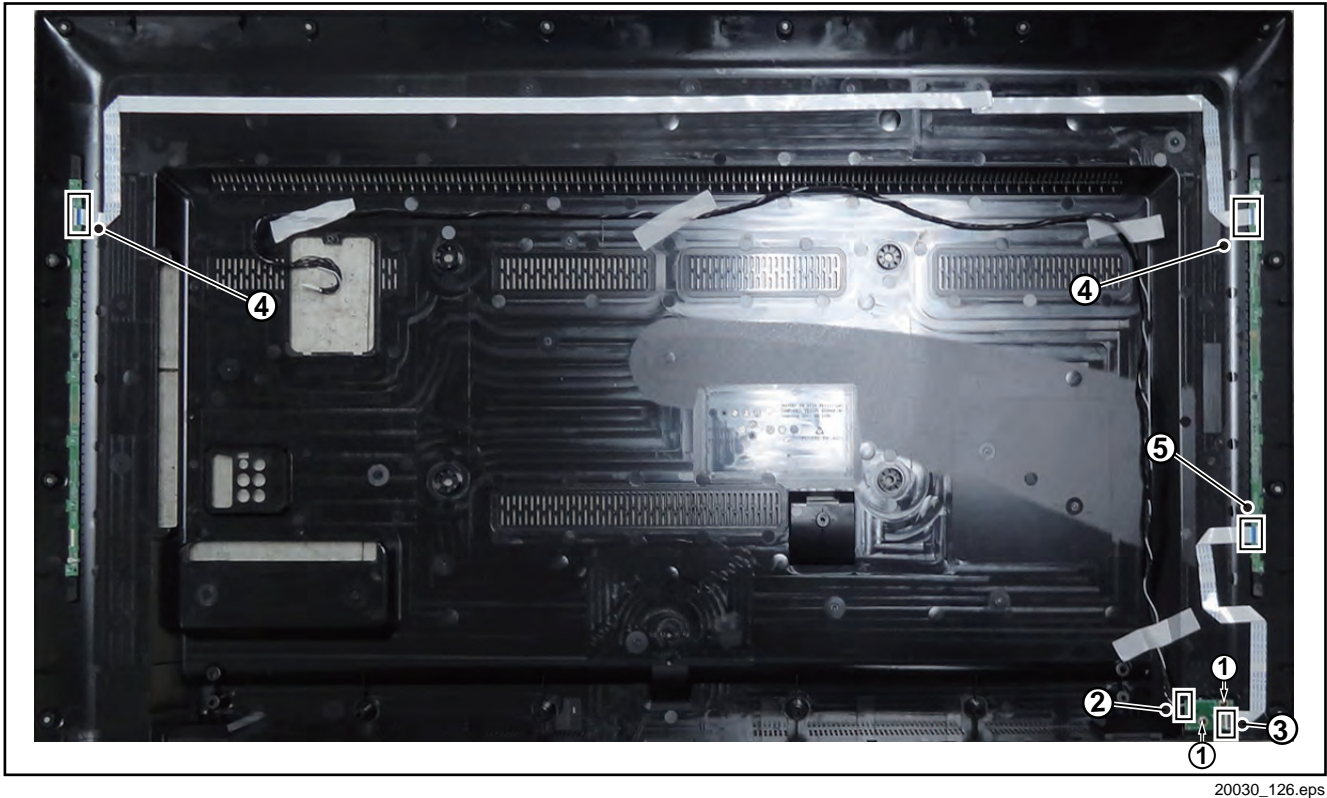
20030_125.eps

Figure 4-39 Rear cover removal[2]

4.6.2 AmbiLight Panel

Refer to [Figure 4-40](#) for details.

1. Gently release the clamps and unplug the connectors [4] that secure the ambilight panels. Release the clips from the FFC connector that connect with the keyboard [5].
2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the ambilight panel from the rear cover.



20030_126.eps

Figure 4-40 Ambilight and Keyboard removal

4.6.3 Keyboard Control Unit

Refer to [Figure 4-40](#) for details.

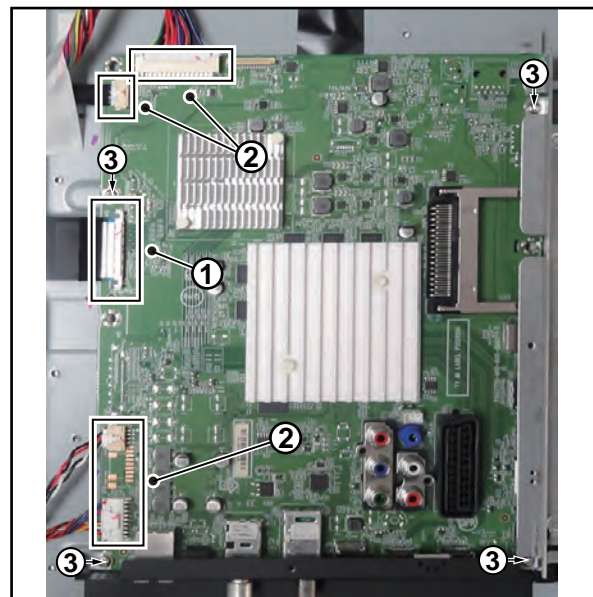
1. Release the connectors [2] and [3] from the keyboard control panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.6.4 Small Signal Board (SSB)

Refer to [Figure 4-41](#) for details.

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors!
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-41](#) for details.



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Figure 4-41 SSB removal

4.6.5 IR/LED Board

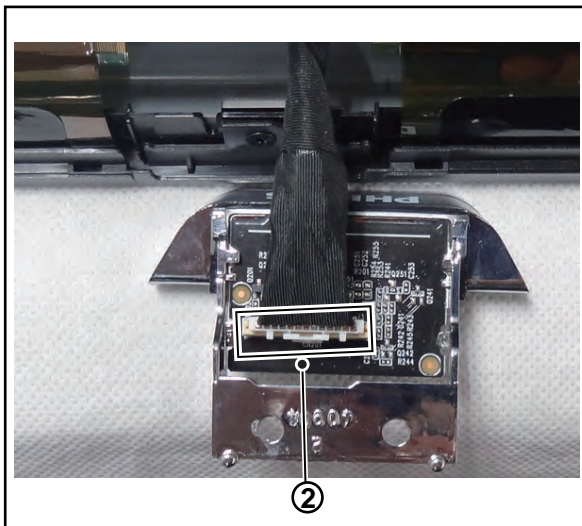
Refer to [Figure 4-42](#) and [Figure 4-43](#) for details.

1. Remove the fixation screws [1] from the stand bracket, pull out the assy from the set. Refer to [Figure 4-42](#) for details.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the IR/LED board. The IR/LED Board can now be lifted and taken out from the cover. Refer to [Figure 4-43](#) for details.



20030_128.eps

Figure 4-42 IR/LED Board removal[1]



20030_129.eps

Figure 4-43 IR/LED Board removal[2]

4.6.6 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Gently unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.7 Assembly/Panel Removal (for 7601 series)

Instructions below apply to the 65PUT7601/98, but will be similar for other 65"PUT7601 series models.

1. Remove the fixation screws [1] that secure the stand

4.6.7 Speakers

1. Gently release the tapes that secure the speaker cables.
 2. Unplug the speaker connector from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

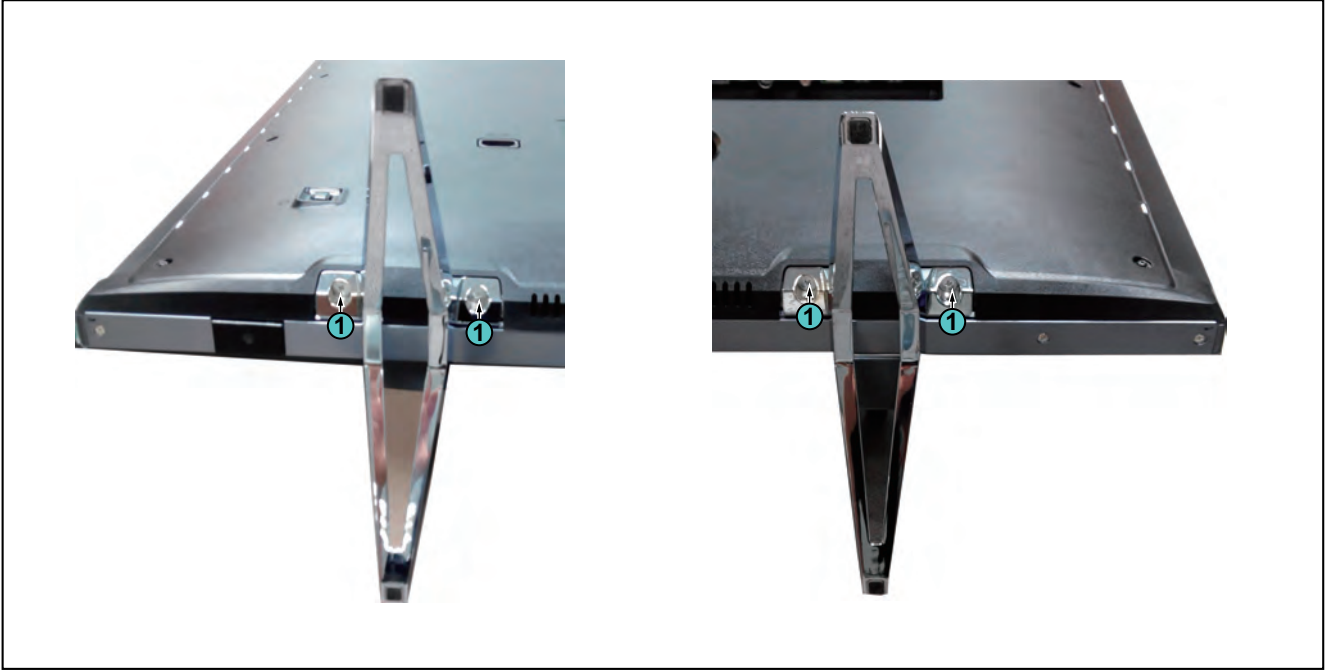
4.6.8 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR/LED as described earlier.
 6. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 7. Remove all other metal parts not belonging to the panel.
 8. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.7.1 Stand

Refer to [Figure 4-44](#) for details.
Refer to [Figure 4-44](#) for details.

2. Take the stand bracket out from the set.



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Figure 4-44 Stand removal

4.7.2 Rear Cover

Refer to [Figure 4-45](#) & [Figure 4-46](#) for details.

Warning: Disconnect the mains power cord before removing the rear cover.

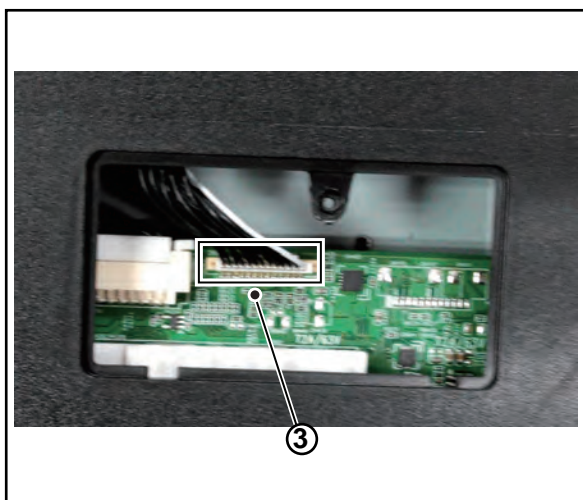
1. Remove the fixation screws [1] and [2] that secure the rear cover. Refer to [Figure 4-45](#) for details.

2. Unplug the connector [3] from SSB. Refer to [Figure 4-46](#) for details.
3. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.



20152_103.eps

Figure 4-45 Rear cover removal[1]



20152_104.eps

Figure 4-46 Rear cover removal[2]

4.7.3 AmbiLight Panel

Refer to [Figure 4-47](#) for details.

1. Gently release the clamps and unplug the connectors [5] that secure the ambilight panels. Release the clips from the

- FFC connector that connect with the Keyboard control panel [4].
2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the Ambilight panel from the rear cover.

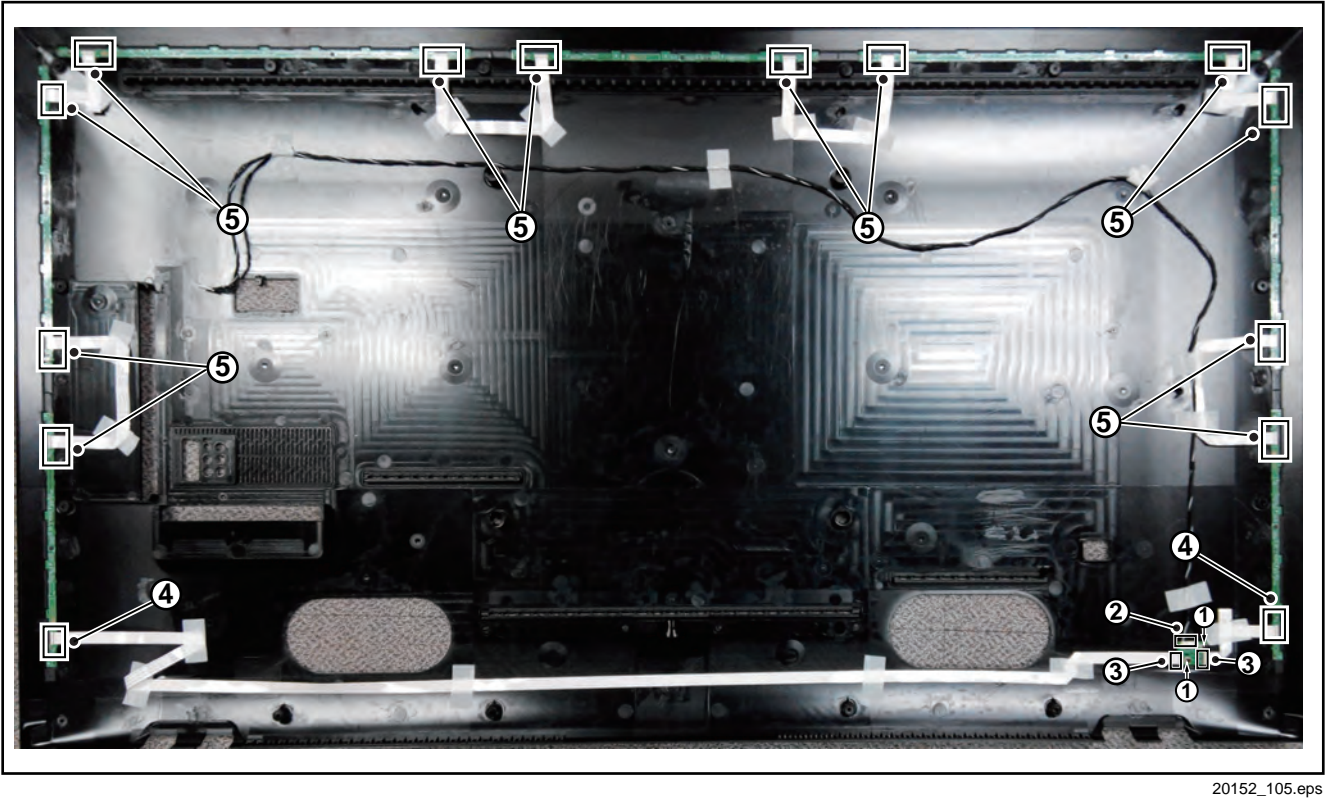


Figure 4-47 Ambilight and Keyboard removal

4.7.4 Keyboard Control Unit

Refer to [Figure 4-47](#) for details.

1. Release the connector [2] from the SSB Board, then release the connectors [3] from the Ambilight panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.7.5 Small Signal Board (SSB)

Refer to [Figure 4-48](#) for details.

- Caution:** it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.
1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors! Unplug the cable/flat foils connector.
2. Unplug the FFC cable[2] and other connectors [3].
3. Remove all the fixation screws from the SSB [4].
4. Take out the SSB with I/O bracket.
5. The SSB can now be shifted away from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-48](#) for details.

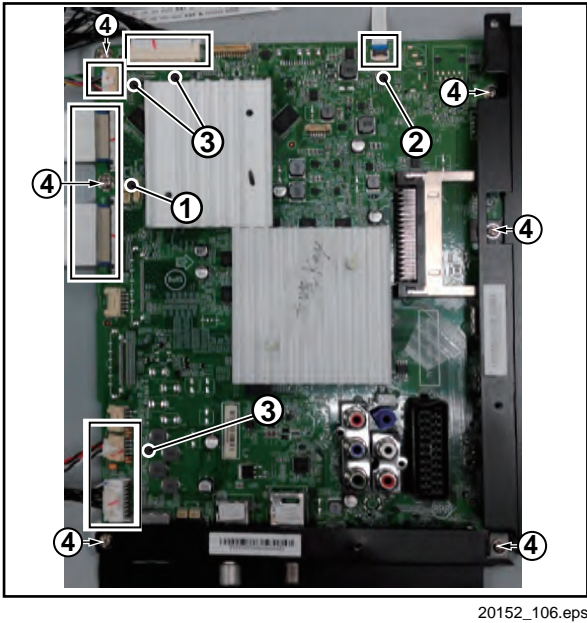


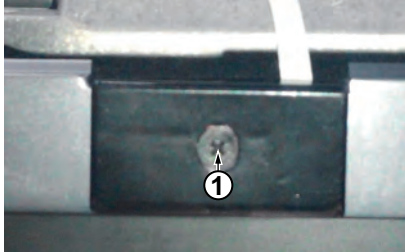
Figure 4-48 SSB removal

4.7.6 IR/LED Board

Refer to [Figure 4-49](#) for details.

1. Remove the fixation screw [1] from the bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the IR/LED board. The IR/LED Board can now be lifted and taken out from the cover.

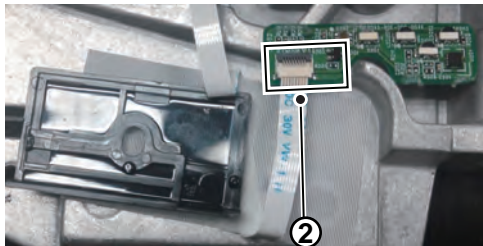
Step 1



Step 2



Step 3



20152_107.eps

Figure 4-49 IR/LED Board removal

4.7.7 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.7.8 Speakers

1. Gently release the tapes that secure the speaker cables.
 2. Unplug the speaker connector from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

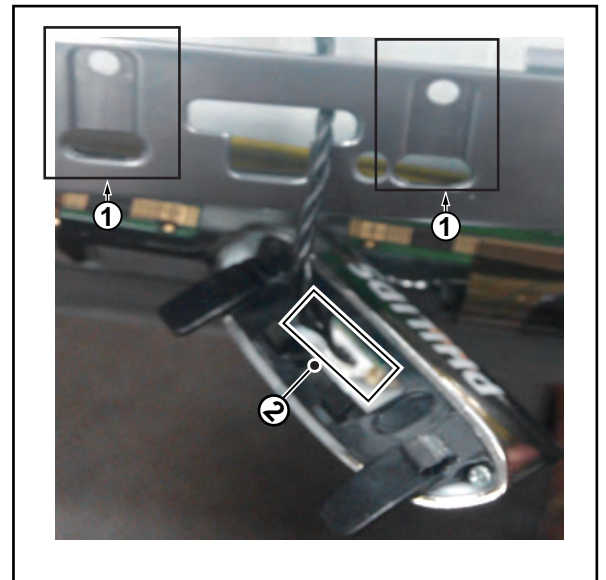
4.7.9 WIFI module

1. Unplug the connector from the SSB.
 2. Remove fixation screw that secure the WIFI module, getntly remove the module from the set.
- When defective, replace the whole unit.

4.7.10 LED Logo Board

Refer to [Figure 4-50](#) for details.

1. Remove from the fixation area[1] on the bracket, pull out the assy from the set.
2. Carefully Release the cover secured by clips, then unplug the connector [2] from the LED Logo board. The LED Logo board can now be lifted and taken out from the cover.



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Figure 4-50 LED Logo Board removal

4.7.11 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR/LED as described earlier.
 6. Remove the WIFI module as earlier.
 7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 8. Remove all other metal parts not belonging to the panel.
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.8 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See [Figure 4-1](#) to [Figure 4-14](#).
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- [5.1 Service Modes](#)
- [5.2 Stepwise Start-up](#)
- [5.3 Service Tools](#)
- [5.4 Software Upgrading](#)
- [5.5 Error Codes](#)
- [5.6 The Blinking LED Procedure](#)
- [5.7 Fault Finding and Repair Tips](#)

5.1 Service Modes

The Service Mode feature is split into five parts:

- Service Alignment Mode (SAM).
- Factory Mode.
- Customer Service Mode (CSM).

SAM and the Factory mode offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- Make alignments (e.g. White Tone), reset the error buffer (SAM and Factory Mode).
- Display information ("SAM" indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, "CSM", is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

Note: For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old "MENU" button is now called "HOME" (or is indicated by a "house" icon).

5.1.1 General

Next items are applicable to all Service Modes or are general.

Life Timer

During the life time cycle of the TV set, a timer is kept (called "Op. Hour"). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SAM in a decimal value. Every two soft-resets increase the hour by + 1. Stand-by hours are not counted.

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SAM, and CSM.

The screen will show: "AAAAAB-XXX.YYY.MMM.TTT", where:

- AAAAA is the chassis name: QM163.
- B is the region indication: E = Europe, A = AP/China, U = NAFTA, L = LATAM.
- XXX is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 99 and AA - ZZ.
 - If the main version number changes, the new version number is written in the NVM.

- If the main version number changes, the default settings are loaded.
- YYY is the sub version number: this is updated with a minor change (backwards compatible with the previous versions). Numbering will go from 000 - 999.
 - If the sub version number changes, the new version number is written in the NVM.
 - If the NVM is refreshed, the software identification, version, and cluster will also be written to NVM.

Set Option Code

When the SSB (or the Display Panel) of a TV set has been replaced, then the option codes in the NVM no longer match the modified TV set. This might result in "no display" on screen. So replacing the SSB (and/or the Display Panel) at customer site or Work Shop requires adapting option codes in the NVM to correct value.

On Android TV sets setting only one single 3-digit Set Option code allows the SSB software to enable the appropriate option codes and White Point values.

The stickers on the Android TV sets now contain the Set Option code (i.s.o. the Display Option code).

Finally, only the few TV set related items have to be manually set.

Set Option Code Process (Android MTK 2k16 sets)

- The service technician enters the Set Option code mentioned on the service stickers of the TV set via Blind SAM.
- After accepting the Set Option code the TV set stores the corresponding items (option codes and White Point values) in the NVM.
- The service technician manually adapts the TV related items in the NVM:
 - Set Type (Model No), and
 - Production code (Prod. No).

5.1.2 Service Alignment Mode (SAM)

Purpose

- To modify the NVM.
- To display/clear the error code buffer.
- To perform alignments.

Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

How to Activate SAM

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "062596", directly followed by the "INFO/OK" button. Do not allow the display to time out between entries while keying the sequence.

After entering SAM, the following items are displayed, with "SAM" in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

Table 5-1 Service Alignment Mode Overview

Main Menu	Sub-menu 1	Sub-menu 2	Description
Hardware info			View SW version, Standby processor version and Production code.
Operation hours			View the normal operation hours (no Stand-by hours) counted by the life timer.
Shop operation hours			View the normal shop operation hours (no Stand-by hours) counted by the life timer.

Main Menu	Sub-menu 1	Sub-menu 2	Description
Errors			View all the errors detected since the last time the error buffer was erased. Five errors are possible.
Reset error buffer			Reset the error buffer.
Alignments	White point Refer to 6.3 Software Alignments (Alignments) for details.	Colour temperature	Select the colour mode: Normal - Warm - Cool, and check the result on screen.
		White point red	Adjust the white point red value (0 - 127) and check the result on screen.
		White point green	Adjust the white point green value (0 - 127) and check the result on screen.
		White point blue	Adjust the white point blue value (0 - 127) and check the result on screen.
AmbiLight	Select module		Select the AmbiLight module (01-09) and check result.
	Brightness		Adjust AmbiLight brightness (0-100) and check result.
Option numbers	Group 1		View and change option number Group 1 (four numbers, five decimals each).
	Group 2		View and change Group 2 Option number (four numbers, five decimals each).
	Store		Store the Option numbers.
Store			Store
Software maintenance	Software events	Display	
		Clear	
		Test reboot	
		Test kernel crash	
		Test application crash	(-1, 0, 1 to 9)
	Hardware events	Display	
		Clear	
Test setting	Digital info		Test setting.
BT Pairing tables	Clear paired remote control		Clear paired remote control.
Wi-Fi Direct settings	Reset Wi-Fi Direct group		Reset Wi-Fi Direct group.
Development 1 file versions			Development 1 file versions.
Development 2 file versions			Development 2 file versions.
Upload to USB			Upload several settings from the TV set to a USB stick.
Download from USB			Download several settings from the USB stick to the TV set.
NVM editor	Type number		View and change in the NVM-editor the set type number, the set production code or the 18AC of a part.
	Production code		Note: The NVM-editor still has the same function as before, alpha-numeric entry.
	18AC SSB		
	18AC display		
	18AC supply		

How to Navigate SAM

Use the following remote control buttons to navigate through SAM menu's, to select items or define/confirm values.

Table 5-2 SAM Menu Control

Service Menu Function	Remote Control Button
Scroll up in the menu, highlight previous menu item.	Cursor UP
Scroll down in the menu, highlight next menu item.	Cursor DOWN
- Move left/back, or - Decrease the value of the selected menu item, or - Activate the selected sub menu or item.	Cursor LEFT
- Move right/forward, or - Increase the value of the selected menu item, or - De-activate the selected sub menu or item.	Cursor RIGHT
Increase Volume	Volume UP
Decrease Volume	Volume DOWN
Back key	Go to previous level
Confirm the value or select the item	OK
Pressing the MENU button while in top level SAM makes the set switch to the normal user menu (with the SAM mode still active in the background).	MENU (HOME) *

Note: * Some buttons on the remote controls used for the new model range are renamed. For instance, the old "MENU" button is now called "HOME" or is indicated by a "house" icon.

How to Store SAM Settings

To store the settings changed in SAM mode (except RGB Align settings), leave the top level SAM menu by switching off the TV set: use the POWER button on the remote control or the MAINS POWER switch on the TV set.

Store the mentioned exceptions separately by using the STORE button.

How to Exit SAM

Use one of the following methods:

- Switch the TV set to STANDBY using the mains button on the remote control or on the TV set.
- On a standard remote control key in sequence "00".

Note: When the TV set is in SAM mode and switched "off" by a power interrupt, then the TV set will start up in "normal operation mode" as soon as power is switched on. The error buffer, however, will not be reset.

5.1.3 Contents of the Factory mode:

Purpose

- To perform extended alignments.

Specifications

- Displaying and or changing Panel ID information.
- Displaying and or changing Tuner ID information.
- Error buffer clearing.
- Various software alignment settings.
- Testpattern displaying.
- Public Broadcasting Service password Reset.
- etc.

How to Activate the Factory mode

To activate the Factory mode, use the following method:

- Press the following key sequence on the remote control transmitter: from the "menu/home" press "1999", directly followed by the "Back/Return" button. Do not allow the display to time out between entries while keying the sequence.

After entering the Factory mode, the following items are displayed,

Table 5-3 Factory mode overview

Item	Item value	Default value						Description
		32"	43"	49"	55"	65"	75"	
0	F/W VERSION	Press OK						Displays the software versions of the supplier, Flash PQ, Smart Picture, BL Dimming, Source Meter, the Picture Quality checksum, the Dimming library, the Source meter library, the Flash AQ, MCU and OAD software versions.
1	PANEL_ID	Refer to 6.3 Software Alignments .						Displays the Panel ID. Use left and right cursor to change the Panel ID, but keep in mind that selecting the wrong ID might result in not correct displaying the screen!
2	DEMOT_TYPE	3	3	3	3	2	3	Choose demot type.
3	NVM ADDRESS	0						NVM address 0 to 8191, Use Item 6 to change and 7 to store the data to the correct NVM address
4	NVM VALUE	0						Displays the value at the NVM address of item 5
5	NVM STORE	Press OK						Use this option to save the data of item 6 to NVM address of item 5
6	COPY NVM to USB	Press OK						Allows copying the TV settings to an USB stick, e.g. before replacing the SSB. The TV settings ("Channel list", "Personal settings", "Option codes", "Display-related alignments" and "History list") kept in the NVM are stored in two files. 1. The TV puts the two files in a folder REPAIR, which it created on a FAT formatted USB stick. 2. When the download on the USB stick failed, "Failure" will appear. In this case check if the USB stick is properly connected. Note: Uploading is of course only possible if software is running and if a picture is available.
7	COPY NVM to TV	Press OK						Allows putting the NVM data stored on an USB stick to the TV set or to another SSB, e.g. after SSB replacement. 1. The TV set saves the two files previously created in its NVM. 2. If "USB to TV Success" is displayed, then unplug and plug power to restart the TV.
8	TV Settings Key	1	1	1	1	1	1	TV Settings Key
9	TV Settings VALUE	0	0	0	0	0	0	TV Settings VALUE
10	TV Settings STORE	Press OK						TV Settings STORE
11	COPY TV Settings to USB	Press OK						COPY TV Settings to USB
12	COPY TV Settings to TV	Press OK						COPY TV Settings to TV
13	VIRGIN_MODE	Off	Off	Off	Off	Off	Off	Puts the TV set back in virgin mode, if not already (so in case the TV set has not been used yet).
14	ORT_MODE	On	On	On	On	On	On	ORT mode
15	DRMWARNING	On	On	On	On	On	On	Warning the data rights management
16	AGEING MODE	Off	Off	Off	Off	Off	Off	Use this for aging a new LCD panel
17	COLOR TEMP MODE	Normal	Normal	Normal	Normal	cool		Select color temperature mode: Normal - Cool - Warm.
18	CLR_TEMP_R	0	0	127	127	127	119	Red colour temperature setting
19	CLR_TEMP_G	0	0	103	114	126	123	Green colour temperature setting
20	CLR_TEMP_B	0	0	87	108	127	127	Blue colour temperature setting
21	ADC_GAIN_R	255	255	255	255	255	255	Red ADC gain
22	ADC_GAIN_G	255	255	255	255	255	255	Green ADC gain
23	ADC_GAIN_B	255	255	255	255	255	255	Blue ADC gain
24	ADC_OFFSET_R	127	127	127	127	127	127	Red ADC offset
25	ADC_OFFSET_G	127	127	127	127	127	127	Green ADC offset
26	ADC_OFFSET_B	127	127	127	127	127	127	Blue ADC offset
27	AUD_GAIN_HDMI	0	0	0	0	0	0	HDMI audio gain
28	AUD_GAIN_ATV	12	12	12	12	12	12	Analogue TV audio gain
29	AUD_GAIN_DTV	0	0	0	0	0	0	Digital TV audio gain
30	AUD_GAIN_USB	0	0	0	0	0	0	USB audio gain
31	AUD_GAIN_SPDIF	0	0	0	0	0	0	SPDIF audio gain
32	AUD_GAIN_LEN-IN	0	0	0	0	0	0	LEN-IN audio gain
33	AQ_INDEX	11	6	7	9	7	8	Audio Quality index
34	Copy PQ to USB	Press OK						Saves the picture quality data to a file "pq.bin" to the root of a FAT formatted USB memory stick
35	Copy PQ to TV	Press OK						Loads the picture quality data from a file "pq.bin" in to the TV
36	Copy AQ to USB	Press OK						Loads the audio quality data from a file "AQ.bin" in to the TV
37	Copy AQ to TV	Press OK						Loads the audio quality data from a file "AQ.bin" in to the TV
38	COPY DB CHL to USB	Press OK						Copy the USB channel list to USB
39	COPY DB CHL to TV	Press OK						Copy the TV channel list to TV
40	LIGHT SENSOR TYPE	8	8	10	1	9	13	Light sensor type
41	TEMP SENSOR TYPE	0	0	0	0	0	0	Temperature sensor
42	LED TYPE	0	0	0	0	0	0	The type of LED
43	AMBILIGHT TYPE	Side Segments						Select the type of AmbiLight: segments (side - top - bottom)
44	AMBILIGHT TYPE VALUE	2	3	3	4	4	6	The type value of Ambient light
45	3D	0	0	0	0	0	0	3D on/off
46	BLUETOOTH	1	1	1	1	1	1	BLUETOOTH
47	ARC TEST	On	On	On	On	On	On	ARC test
48	HDMI ARC OUTPUT ORDER	EU						HDMI ARC OUTPUT ORDER
49	UART ENABLE	On	On	On	On	Off	Off	UART ENABLE

Item	Item value	Default value						Description
		32"	43"	49"	55"	65"	75"	
50	RESET MAC ADDRESS	Press OK						RESET MAC ADDRESS
51	EXIT_FACTORY	Press OK						Exits the Factory mode

How to Exit the Factory mode

Use one of the following methods:

- Select EXIT_FACTORY from the menu and press the "OK" button.

Note: When the TV is switched "off" by a power interrupt, or normal switch to "stand-by" while in the factory mode, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.

5.1.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings. The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call centre to diagnose problems and failures in the TV set before making a service call.

The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

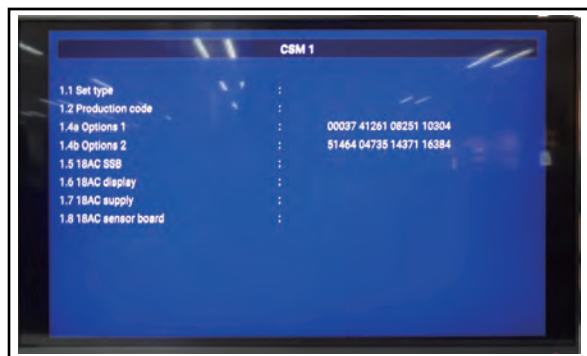
- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate CSM

To activate CSM, press the following key sequence on a standard remote control transmitter: "123654" (do not allow the display to time out between entries while keying the sequence). After entering the Customer Service Mode, the following items are displayed.

Note: Activation of the CSM is only possible if there is no (user) menu on the screen!

CSM Mode Overview

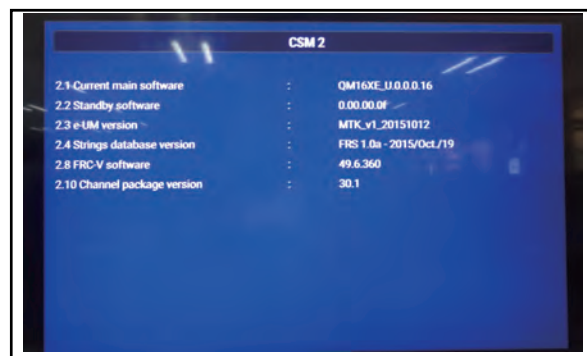


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Figure 5-1 CSM [1/3]

1.1 Set Type This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM.

- 1.2 Production code** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM.
- 1.4 a Option Code 1** Gives the option codes of option group 1 as set in SAM.
- 1.4b Option Code 2** Gives the option codes of option group 2 as set in SAM.
- 1.5 18AC SSB** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. This identification number is the 12NC number of the SSB.
- 1.6 18AC Display** 18NC NVM read/write.
- 1.7 18AC Supply** 18AC NVM read/write.
- 1.8 18AC sensor board** 18AC NVM read/write.

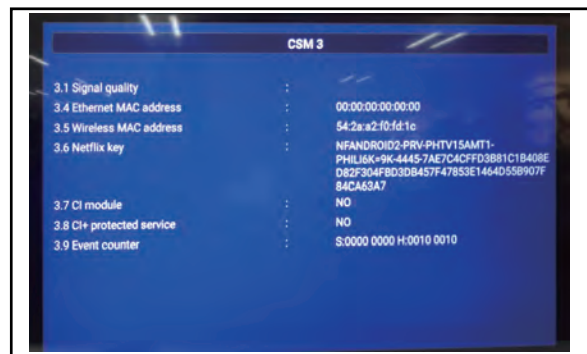


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Figure 5-2 CSM [2/3]

2.1 Current Main SW Displays the built-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the internet.

- 2.2 Standby Software** Displays the built-in stand-by processor software version. Upgrading this software will be possible via USB.
- 2.3 e-UM version** eDFU (help) version.
- 2.4 Strings database version** Displays the version of strings database.
- 2.8 FRC-V software** Software of FRC-V.
- 2.10 Channel package version** version of channel package.



20030_043.eps

Figure 5-3 CSM [3/3]

3.1 Signal Quality Analog/digital signal strength.

- 3.4 Ethernet MAC address** A Media Access Control address (MAC address) is a unique identifier assigned to

network interfaces for communications on the physical network segment.

- **3.5 Wireless MAC address** Wireless Media Access Control address.
- **3.6 Netflix key** Indicates the validity of the netflix key. In case this key are not valid and the customer wants to make use of the functionality, the SSB has to be replaced.
- **3.7 CI module** Indicates the module of CI.
- **3.8 CI+ protected service** The IC+ protected service.
- **3.9 Event counter** The counter of event.

How to Navigate

By means of the "CURSOR-DOWN/UP" knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

How to Exit CSM

To exit CSM, use one of the following methods.

- Press the MENU/HOME button on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.2 Stepwise Start-up

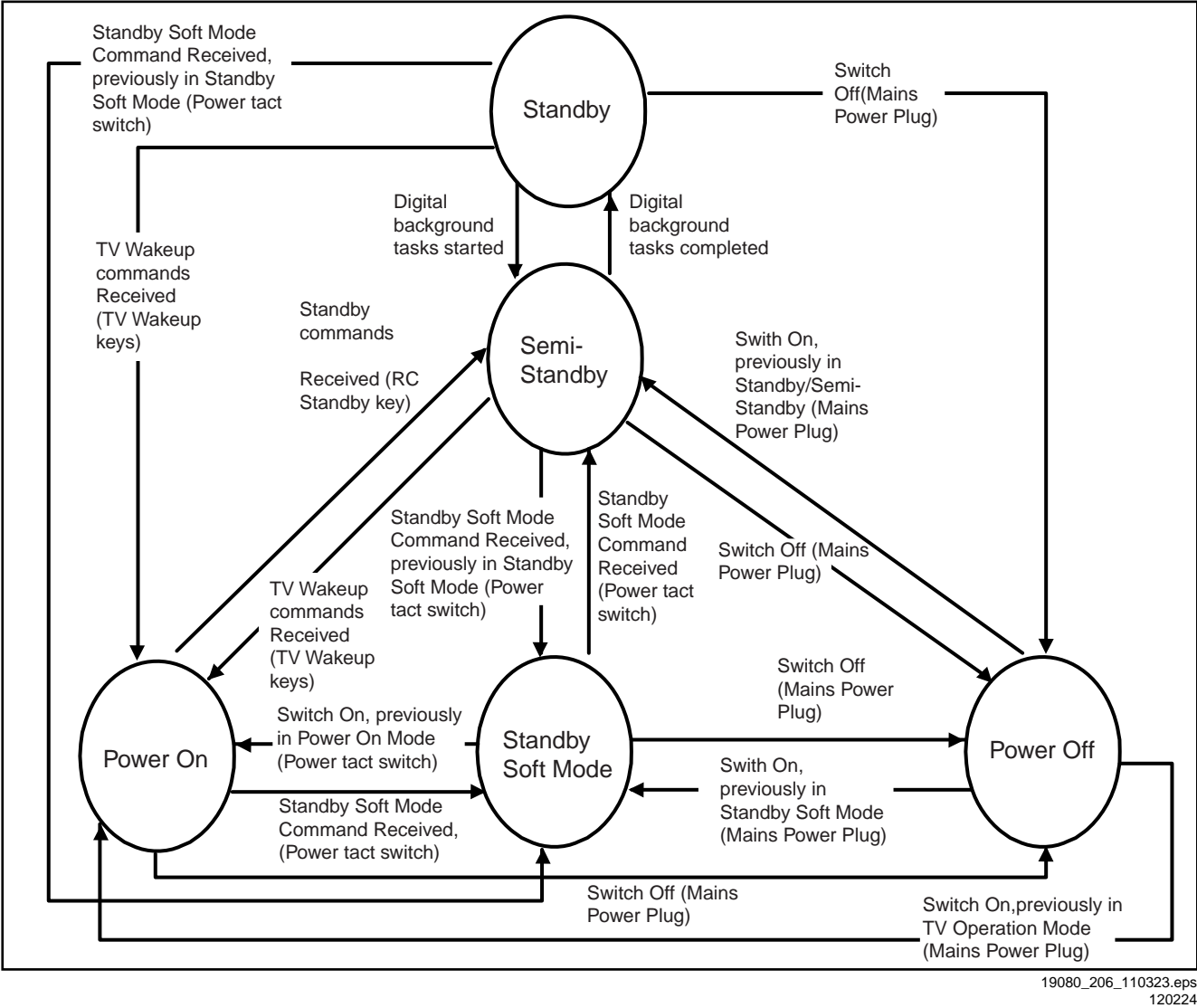


Figure 5-4 Stepwise Start-up

5.3 Service Tools

5.3.1 ComPair

The ComPair Tool is no longer supported here. Still, the interface box can be used as level shifter between the TV chassis and PC.

5.4 Software Upgrading

5.4.1 Description

It is possible for the user to upgrade the main software via the USB port. This allows replacement of a software image in a stand alone set. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

5.4.2 Introduction

Philips continuously tries to improve its products, and it's recommend that the TV software is updated when updates are available. Software update files can be obtained from the dealer or can be downloaded from the following websites:

<http://www.philips.com/support>

Preparing a portable memory for software upgrade

The following requirements have to be met:

1. A personal computer connected to the internet.
2. An archive utility that supports the ZIP-format (e.g. WinZip for Windows or Stuffit for Mac OS).
3. A FAT formatted USB memory stick (preferably empty).

Note:

1. Only FAT/DOS-formatted memory sticks are supported.
2. Only use software update files that can be found on the <http://www.philips.com/support> web site.

5.4.3 Check the current TV software version

Before starting the software upgrade procedure, it is advised to check that what the current TV software:

1. Press the "1 2 3 6 5 4" button on the remote control to enter the CSM mode.
2. Use the up/down cursor keys to select "Current Main Software".

If the current software version of the TV is the same as the latest update file found on <http://www.philips.com/support>, it is not necessary to update the TV software.

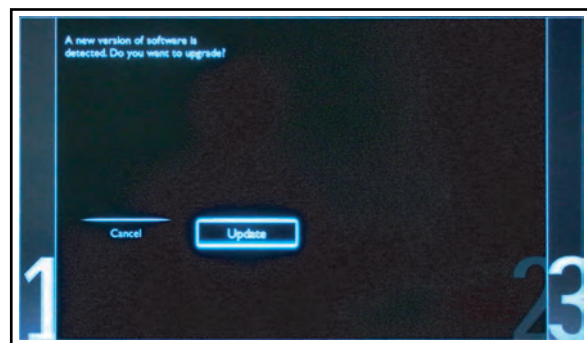
5.4.4 Download the latest software

1. Open the internet page <http://www.philips.com/support>.
2. Find information and software related to the TV.
3. Select the latest software update file and download it to the PC.
4. Insert the USB memory stick into one of the USB ports of the PC.
5. Decompress the downloaded ZIP file and copy it to the root directory of the USB flash drive.

5.4.5 Update the TV software

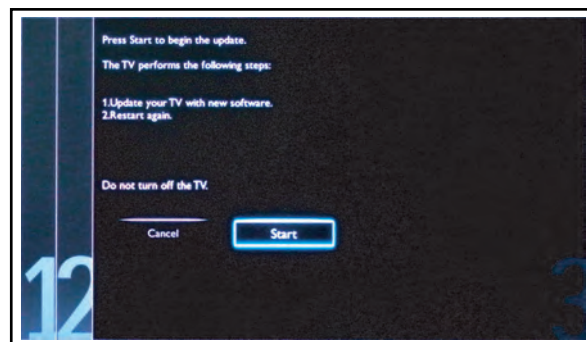
1. Turn the TV on and wait for it to boot completely.
2. Insert the USB memory stick that contains the software update files in one of the TV's USB ports.
3. The TV will detect the USB memory stick automatically. Then a window jumps out as [Figure 5-5](#).
Note: If the USB flash drive is not detected after power up, disconnect it and re-insert it.
4. Select [Update] and press OK. See [Figure 5-5](#).
5. To proceed, In next menu select [Start] and press OK to start software updates. See [Figure 5-6](#).

6. Upgrading will now begins and the status of the updating progress will be displayed.
7. When the TV software is updated. Remove your USB flash drive, then select [Restart] and press OK to restart the TV. See [Figure 5-7](#).



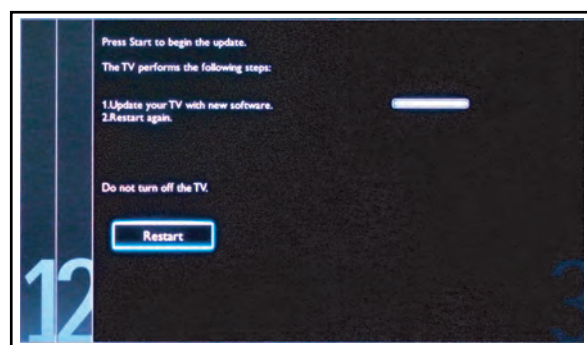
19080_207_110324.eps
110324

Figure 5-5 Update the TV software [1/3]



19080_208_110324.eps
110324

Figure 5-6 Update the TV software [2/3]



19080_209_110324.eps
110324

Figure 5-7 Update the TV software [3/3]

Note:

- Do not remove the USB flash drive during the software update.
- If a power failure occurs during the update, do not remove the USB flash drive from the TV. The TV will continue the software update as soon as the power comes up again.
- If an error occurs during the update retry the procedure or contact the dealer.
- We do not recommend downgrading to an older version.
- Once the upgrade is finished, use the PC to remove the TV software from the USB portable memory.

5.4.6 Content and Usage of the One-Zip Software File

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it. Only files that are relevant for Service are mentioned here.

- **EDID_clustername.zip:** Contains the EDID content of the different EDID NVMs.
- **FUS_clustername_version.zip:** Contains the file downloaded which is needed to upgrade the TV main software and the software download application.
- **NVM_clustername_version.zip:** Default NVM content.

5.4.7 How to Copy NVM Data to/from USB

When copying data to and from a USB memory stick, the folder "repair" is used. When inserting an empty USB memory stick, and downloading data to the stick, the TV will create this folder. When sending data from a USB memory stick to a TV, the intended data must be available in the "repair" folder. Note that when copying EDID data to the TV, all necessary EDID files must be in this folder.
Service mode overview for your reference.

Table 5-4 Service mode overview

Service Modes	Description
SAM	Service alignment mode
Factory Mode	Used for extended alignments
CSM	3-page compact CSM pages. There will be CSM dump to USB-stick upon entering CSM-mode
USB SW upgradeable	SW-upgrading of flash memories MT5593UGIJ can be done via USB. The main SW can be upgraded via the ZIP file downloaded.
NVM-Editor in SAM	NVM-editor will function as in the past: Address and Value field is a decimal value via digit entry
Service Data	New Service data in SAM for CTN, Prod. no., 12NC programming with virtual keyboard
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	There will be printout available in UART. No specifications of the printout, per MTK provision/definition.
Blind SAM	RC sequence "062598" + "Menu" + "Panel code"
Clear Buffer	RC sequence "062599" + "OK" or via SAM

5.5 Error Codes

5.5.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

- Activated (SW) protection.
- Failing I²C device.
- General I²C error.

The last five errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left. An error with a designated error code **never** leads to a deadlock situation. It must always be diagnosable (e.g. error buffer via OSD or blinking LED).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

5.5.2 How to Read the Error Buffer

You can read the error buffer in three ways:

- On screen via the SAM/CSM (if you have a picture).
Example:
 - **ERROR: 000 000 000 000 000:** No errors detected
 - **ERROR: 013 000 000 000 000:** Error code 13 is the last and only detected error
 - **ERROR: 034 013 000 000 000:** Error code 13 was detected first and error code 34 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See paragraph [5.7 Fault Finding and Repair Tips](#).

5.5.3 Error codes

In this chassis only "layer 2" error codes are available and point to problems on the SSB. They are triggered by LED blinking when CSM is activated. Only the following layer 2 errors are defined:

Description	LAYER 1 error	LAYER 2 error	Monitored	Error	I ² C address	EB: in error buffer BL: Blinking LED	Device	Defective board
				Prot.				
I ² C BUSES								
DSP bus (00)	2	11	SOC	E	00	BL/EB	SSB	Audio DSP
AMP bus (01)	2	12	SOC	E	01	BL/EB	SSB	Audio DSP
SSB bus (0F)	2	13	SOC	E	0F	BL/EB	SSB	SSB
BE bus (3F)	2	14	SOC	E	3F	BL/EB	SSB	SSB
FE bus (2F)	2	17	SOC	E	2F	BL/EB	SSB	SSB
DISP bus (30)	2	18	SOC	E	30	BL/EB	SSB	Display
AMBI bus (31)	2	19	SOC	E	31	BL/EB	SSB	Proj AL
SOC doesn't boot (HW cause)	2	15	St-by μP	P	D4	BL	MT5593	SSB
Supply related								
12V	3	16	St-by μP	P		BL		Supply
SSB								
I ² C switch (SSB bus)	9	24	SOC	E	E0	EB	PCA9540	Audio DSP
I ² C switch (BE bus)	2	25	SOC	E	E0	EB	PCA9540	SSB
Channel dec	2	27	SOC	E	C8-CE	EB	Silab Si216x	SSB
Boston (HDMI2.2)	2	29	SOC	E	40	EB	SIL 9777	SSB
Lnb controller	2	31	SOC	E	10	EB	LNBH 25	SSB
Tuner	2	34	SOC	E	C0	EB	Si2151/AV 2019	SSB
Tuner S2	2	36	SOC	E		EB		
Class - D 3 (DSP bus)	9	35	SOC	E	D8	EB	TAS 5760 LD	Audio DSP
Audio DSP	9	36	SOC	E	70	EB		Audio DSP
Class-D 1	2/9	37	SOC	E	D8	EB	TAS5760LD	SSB/Audio DSP
DSP EEPROM	9	38	SOC	E	A0	EB	Durango	Audio DSP
Class - D 2	2/9	39	SOC	E	DA	EB	TAS 5760 LD	SSB/Audio DSP
T° sensor SSB	2	42	SOC	E	98	EB	LM 75	T° sensor
Light sensor	6	43	SOC	E	52	EB	TSL2571	SET
B&O signal board	4	44	SOC	E		EB		
HDD XFS repair	8	45	SOC	E		EB		
DSP doesn't boot (SW cause)	9	52	SOC	E	70	EB	MT5593	Audio DSP
SOC doesn't boot (SW cause)	2	53	St-by μP	P	D4	BL	MT5593	SSB
FRC	2	61	SOC	E	34	EB	NT72324/72333	SSB
ASIC	2	62	SOC	E	84	EB	ASIC	SSB
Display	5	63	SOC	E	34	EB	Innolux	Display

Figure 5-8 Error code overview

5.5.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu
- By using the CLEAR command in the Factory mode:
- By using the following key sequence on the remote control transmitter: **"062599"** directly followed by the **OK** button.

- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.6 The Blinking LED Procedure

5.6.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is “off”. Then this sequence is repeated.

Example (1): error code 4 will result in four times the sequence LED “on” for 0.25 seconds / LED “off” for 0.25 seconds. After this sequence, the LED will be “off” for 1.5 seconds. Any RC command terminates the sequence. Error code LED blinking is in red color.

Example (2): the content of the error buffer is “12 9 6 0 0” After entering SAM, the following occurs.

- 1 long blink of 5 seconds to start the sequence.
- 12 short blinks followed by a pause of 1.5 seconds.
- 9 short blinks followed by a pause of 1.5 seconds.
- 6 short blinks followed by a pause of 1.5 seconds.
- 1 long blink of 1.5 seconds to finish the sequence.
- The sequence starts again with 12 short blinks.

5.6.2 How to Activate Blinking LED Procedurer

Use one of the following methods:

- **Activate CSM.**The blinking front LED will show the layer 1 error(s), this works in “normal operation” mode or automatically when the error/protection is monitored by the standby processor.
In case no picture is shown and there is no LED blinking, read the logging to detect whether “error devices” are mentioned. (see section “[5.7 Fault Finding and Repair Tips](#), [5.7.4 Guidelines Uart logging](#)”).
- **Activate SAM.** The blinking front LED will show the entire content of the LAYER 2 error buffer, this works in “normal operation” mode.

5.7 Fault Finding and Repair Tips

Note:

- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.7.1 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. With this option, single bytes can be changed.

Caution:

- Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

5.7.2 CSM

When CSM is activated and there is an USB stick connected to the TV set, then the software will collect the complete CSM content in a file Csm.xml and dump the file in a folder “CSM” on the USB stick.

When this mechanism works it can be concluded that a large part of the operating system is already working (SOC, USB ...).

5.7.3 No Picture

When you have no picture, first make sure you have entered the correct display code. See paragraph Refer to [6.3 Software Alignments](#) for the instructions.

5.7.4 Guidelines Uart logging

Possible cases:

Uart loggings are displayed:

- We can conclude that the TV-set is starting up and thatcommunication with the flash RAM seems to be supported. The processor is able to read and write in the DRAMs.
- We can not yet conclude that flash RAM and DRAMs are fully operational/reliable. There still can be errors in the data transfers, DRAM errors, read/write speed and timing control.

Uart loggings report fault conditions, error messages, error codes and fatal errors:

- Some failures are indicated by error codes in the logging, check referring to figure [5-8 Error code overview](#).
- I2C bus errors.
- Not all failures or error messages should be interpreted as fault. For instance the root cause can be wrong option codes settings.

5.7.5 Unstable Picture via HDMI input

Check if HDMI EDID data is properly programmed.

5.7.6 No Picture via HDMI input

Check if HDCP key is valid. This can be done in CSM.

5.7.7 TV Will Not Start-up from Stand-by

Possible Stand-by Controller failure. Re-flash the software.

5.7.8 Audio Amplifier

The Class D-IC U606 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.7.9 Loudspeakers

Make sure that the volume is set to minimum during disconnecting the speakers in the ON-state of the TV. The audio amplifier can be damaged by disconnecting the speakers during ON-state of the set!

5.7.10 Display option code

Attention: In case the SSB is replaced, always check the Panel Code in CSM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions.

6. Alignments

Index of this chapter:

[6.1 General Alignment Conditions](#)

[6.2 Hardware Alignments](#)

[6.3 Software Alignments](#)

[6.4 Setting Set Option Code](#)

[6.5 Resetting a repaired SSB](#)

[6.6 Cable position numbers](#)

6.1 General Alignment Conditions

Power supply voltage:

- **EU:** 230 V_{AC} / 50 Hz (± 10%).
- Connect the set to mains via an isolation transformer with low internal resistance.

Video generator RF test signals:

- **EU/AP-PAL models:** PAL B/G TV-signal, minimum 1 mV, 475.25 MHz.
- **US/AP-NTSC models:** NTSC M/N TV-signal, minimum 1 mV, 61.25 MHz (channel 3).
- **LATAM models:** NTSC M TV-signal, minimum 1 mV, 61.25 MHz (channel 3).

Electrical adjustments conditions:

- Allow the set to warm up for about 15 minutes before tests or alignment.
- Refer to correct ground when measuring voltages and waveforms.
Example: Ground for audio signals "AUDIO_GND".
Caution: Do not use heat sinks as ground!
- Use test probe: R_i > 10 MΩ, C_i < 20 pF.
- Use an isolated trimmer/screwdriver for alignments.

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

Aligning Software of Android TV sets is done by simply setting one Set Option code related to the TV set (present on TV set stickers).

This Set Option code includes the Display Option code and default White Point values.

In addition, setting the Set Option code only requires:

- checking the Set type (Model number), present on the same TV set stickers), and
- optionally checking other TV-related items and manually correcting them if wrong.

6.3.1 Display Option Code

On Android TV sets Display Option code is automatically set by setting the Set Option Code.

6.3.2 White Point Alignment

On 2k16 Android TV sets White Point values are automatically set by setting the Set Option Code.

Note:

The colour temperature setting is automatically applied to the TV / VGA / HDMI / AV sources.

6.4 Setting Set Option Code

6.4.1 Introduction

The SSB processor communicates with a large number of I²C IC's in the set. It has to know which IC's to address to ensure good communication and to allow digital diagnosis. Option codes are used to define if IC's are present or absent.

6.4.2 Set Option File

In a 2K16 Android based sets, a SET OPTION code is used instead of the DISPLAY OPTION code.

The Set Option Code feature allows using one single Set Option number to define all settings for a specific TV set type.

The set option can be found in the Set Option file for 2k16 sets present in the Philips for Servicers website.

Refer to **General Service Information "GSC_112872"**.

Example: The 55PUS6551/12 TV sets needs to have printed SET OPTION: 074 and chassis name QM16.3E LA.

Set Option File

The Set Option Codes and corresponding values of all TV set types are included in reference document "Set Option File", which can be downloaded from **Philips for Servicers website** via the following General Service information:

GSC_112872 - "Set Option File for Android sets".

Note:

The official reference for set option and all related values put in the product software is the "checkerboard" containing White Point values calculated by development or received from production.

Example:

The following Figure gives an extract of the Set Option file. It shows the Set Option codes and related options for 49" and 55" TV sets type PUS7101/12.

SERIES	7101			
STROKE	S/12			
CTN	49PUS7101/12	49PUS7101/12	55PUS7101/12	55PUS7101/12
SET OPTION NUMBER	89	97	90	98
Alternative BOM	1	2	1	2
OPTION 1	37	37	37	37
OPTION 2	41275	41275	41275	41275
OPTION 3	8251	8251	8260	8260
OPTION 4	10304	10304	10304	10304
OPTION 5	51528	51528	51528	51528
OPTION 6	4735	4739	4736	4740
OPTION 7	14371	14371	14371	14371
OPTION 8	16384	16384	16384	16384
WP normal R	127	127	127	127
WP normal G	107	107	108	108
WP normal B	90	90	114	114
WP cool R	127	127	125	125
WP cool G	111	111	109	109
WP cool B	108	108	127	127
WP warm R	127	127	127	127
WP warm G	97	97	98	98
WP warm B	51	51	72	72

20031_003_160320.eps
16-03-21

Figure 6-1 Example of Set Option Code & related Options

Diversity

TV sets with the same Commercial Type Number (CTN) do not necessarily have the same Set Option code! In case there is an alternative BOM, they can have a second or more Set Option Codes.

An alternative BOM number usually indicates the use of an alternative Display Panel (or Power Supply). Another Display Code requires using another Set Option Code.

Example 1 - 49PUS7101/12

As is shown in the extract above, this 49" TV set has two alternative BOM numbers (1 and 2) and Set Option Codes 089 and 097.

Example 2 - 55PUS7101/12

Also the 55" version has two alternative BOM numbers and Set Option Codes 090 and 098.

6.4.3 Where to find the Set Option Code

Refer to the stickers on the TV set.
The Set Option Code (three digit decimal value), Set type and Production code can be read from two stickers matching the TV set:

- Family sticker, stuck on the Back Cover:



Figure 6-2 TV Set Family Sticker

- Set Option code sticker, in general, stuck on the Deco frame:

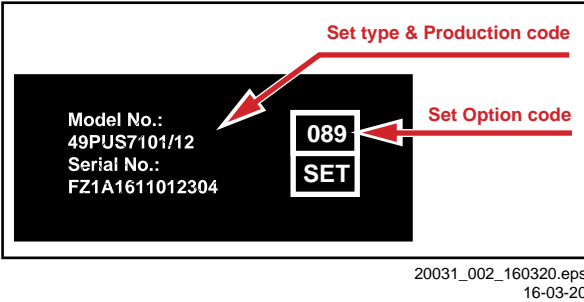


Figure 6-3 Set Option Code Sticker

6.4.4 How to set the Set Option Code after SSB Replacement

1. Take note of the Set Option Code of the TV set.
Set Option Code, Set type and Production code can be read from two stickers on the TV set.
2. Switch "ON" the TV set.
The modified TV set should start up with the default values.

3. Enter the Set Option Code.
Using a standard remote control, successively press:
"062598" + HOME + "xxx",
- with "xxx" is the three digit decimal value of a valid Set Option Code, corresponding with the modified TV set, and
- HOME (MENU) is the button with the home icon.
Result:
After accepting the Set Option Code the TV set stores the following items in NVM:
- the TV Set type (Model Number),
- the related option codes, and
- the default White Point values.
Then the TV set switches to Stand-by to indicate the process is completed.
Note:
Entering a non existing Set Option Code has no effect.
4. Use remote control to switch "ON" the TV set.
5. Use SAM mode to check the **Set type** (Model number) in NVM and to manually correct if it is wrong.
6. Optionally, check other TV-related items present in NVM and manually adapt them via SAM:
- TV Production code (Serial number on stickers),
- 18 AC of replacement SSB (see bar code sticker on SSB),
- 18 AC of actual Power Supply Unit (see bar code sticker on PSU board),
- 18 AC of actual Display Panel.
Result:
After leaving the SAM mode, the TV set should switch to Standby. The NVM should contain the correct option codes, TV related items and default White Point values.

6.5 Resetting a repaired SSB

6.5.1 Introduction

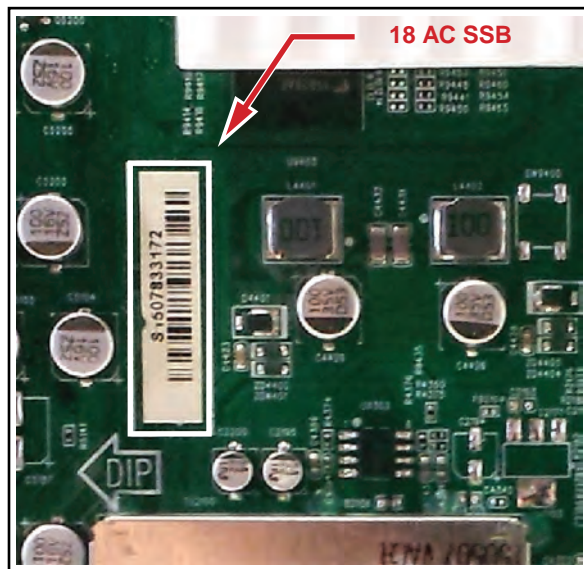
The NVM on an SSB repaired in Service Work Shop (component level repair) must always be reset.
After the repaired or replacement SSB is mounted in the set (board level repair), set the Set Option code and Type number (Model number, CTN) of the TV set and optionally other data of the TV set and its boards.
Refer to [6.4 Setting Set Option Code](#) and [6.5.4 SSB Replacement Flow](#).
This action also ensures correct functioning of the "Smart TV" feature and access to the Smart TV portals.
Finally restore the original channel map, provided that:

- the original channel map was stored on USB stick before repair was started, and
- the basic functionality of the TV, needed for this procedure, was not hampered as a result of the defect.

Refer to the procedure describing the Channel List Copy in the user manual.

6.5.2 SSB Identification

When ordering a new SSB ("Spare"), use the correct number. The ordering number is an 18AC (18 alphanumeric code), with structure <18AC SSB><serial number>. The 18AC can be read from the bar code sticker on the SSB.
Example: see [Figure 6-4](#).



19800_033_151116.eps
16-03-09

Figure 6-4 SSB identification 18AC

6.5.3 SSB Diversity Table

For core SSB spare part diversity Table, refer to Symptom & Cure [GSC 111364](#) from Philips Servicer Network Support.

Remark

- The core SSB spare part (based on high runner) with the same HW diversity in a group is provided.
- The core SSB spare part can be used in other CTNs within the same HW group by changing the Display Panel code, option code wherever applicable.
- Latest SW is to be loaded to the core SSB from Philips for Customers website (P4C) if required.

6.5.4 SSB Replacement Flow

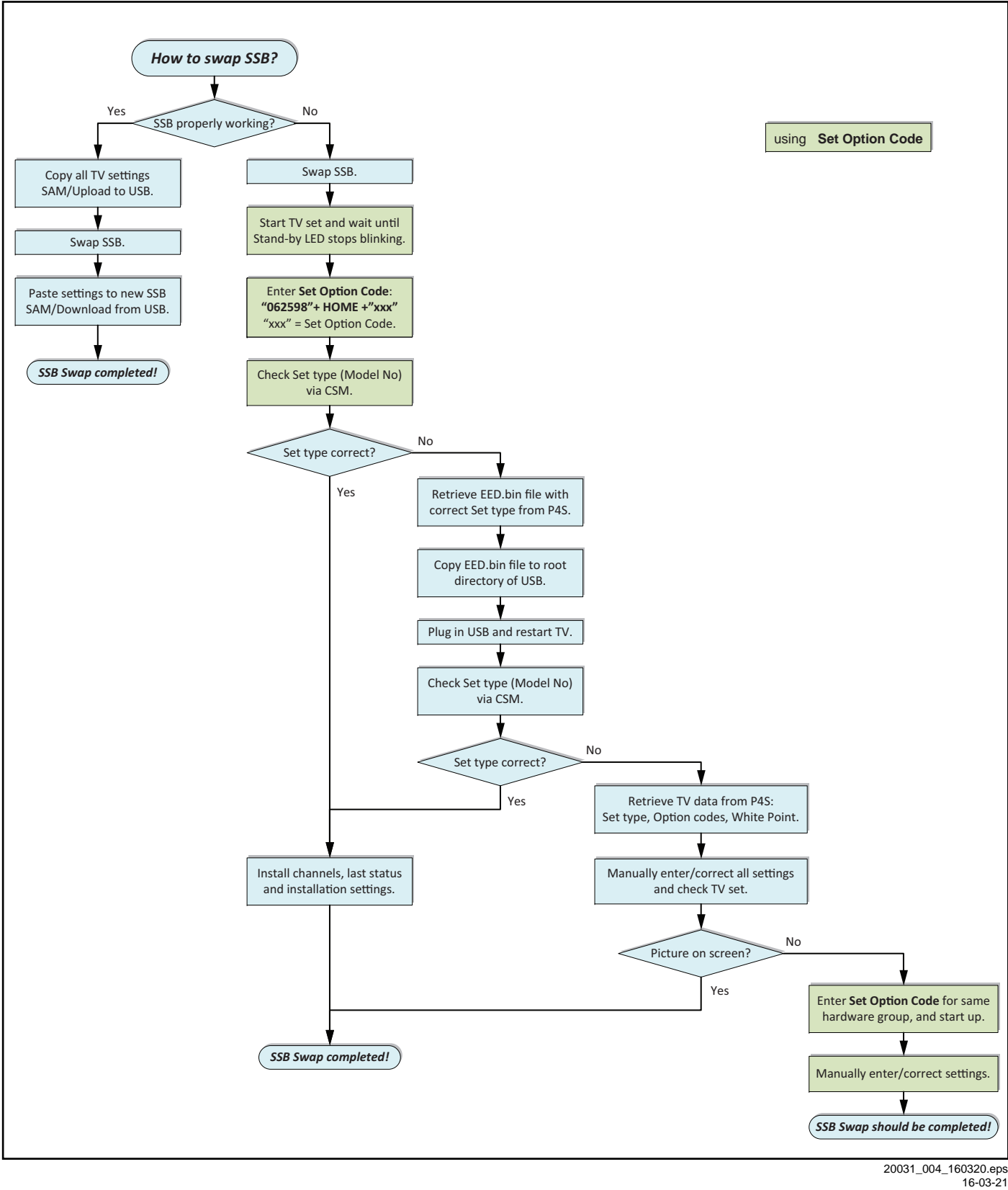


Figure 6-5 SSB Replacement Flow Chart

6.6 Cable position numbers

In this chassis, the cable position numbers can be defined via the rule that the number is always starting with “8” followed by the connector number of the sourcing board. The order is always seen from where the power initiates from. So from PSU

to SSB, from SSB to IR/LED panel, from IR/LED panel to keyboard control panel.
Example: In a 8601 set the cable from the Bolt-on FRC connector CN1155 to the SSB connector CN1155 has position number 8CN1155.

7. Circuit Descriptions

Index of this chapter:

- [7.1 Introduction](#)
- [7.2 Power Supply](#)
- [7.3 DC/DC Converters](#)
- [7.4 Front-End Analogue and DVB-T, DVB-C: ISDB-T reception](#)
- [7.6 HDMI](#)
- [7.7 Video and Audio Processing - MT5593UGIJ](#)

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the wiring block (see chapter [9. Block Diagrams](#)) and circuit diagrams (see chapter [10. Circuit Diagrams and PWB Layouts](#)). Where necessary, you will find a separate drawing for clarification.

7.1 Introduction

The QM16.3E LA is a new chassis launched in Europe in 2016. The whole range is covered by MT5593U+ platform. The major deltas versus its predecessor support DVB-C; DVB-T/T2; DVB S2, with also USB3.0, WIFI/BT, multi-media, smart TV functionality.

The QM16.3E LA chassis comes with the following stylings:

- series xxPUx6401/xx
- series xxPUx6501/xx
- series xxPUx6521/xx
- series xxPUx6551/xx
- series xxPUx6561/xx
- series xxPUx6581/xx
- series xxPUx7101/xx
- series xxPUx7181/xx
- series xxPUx7601/xx

7.1.1 Implementation

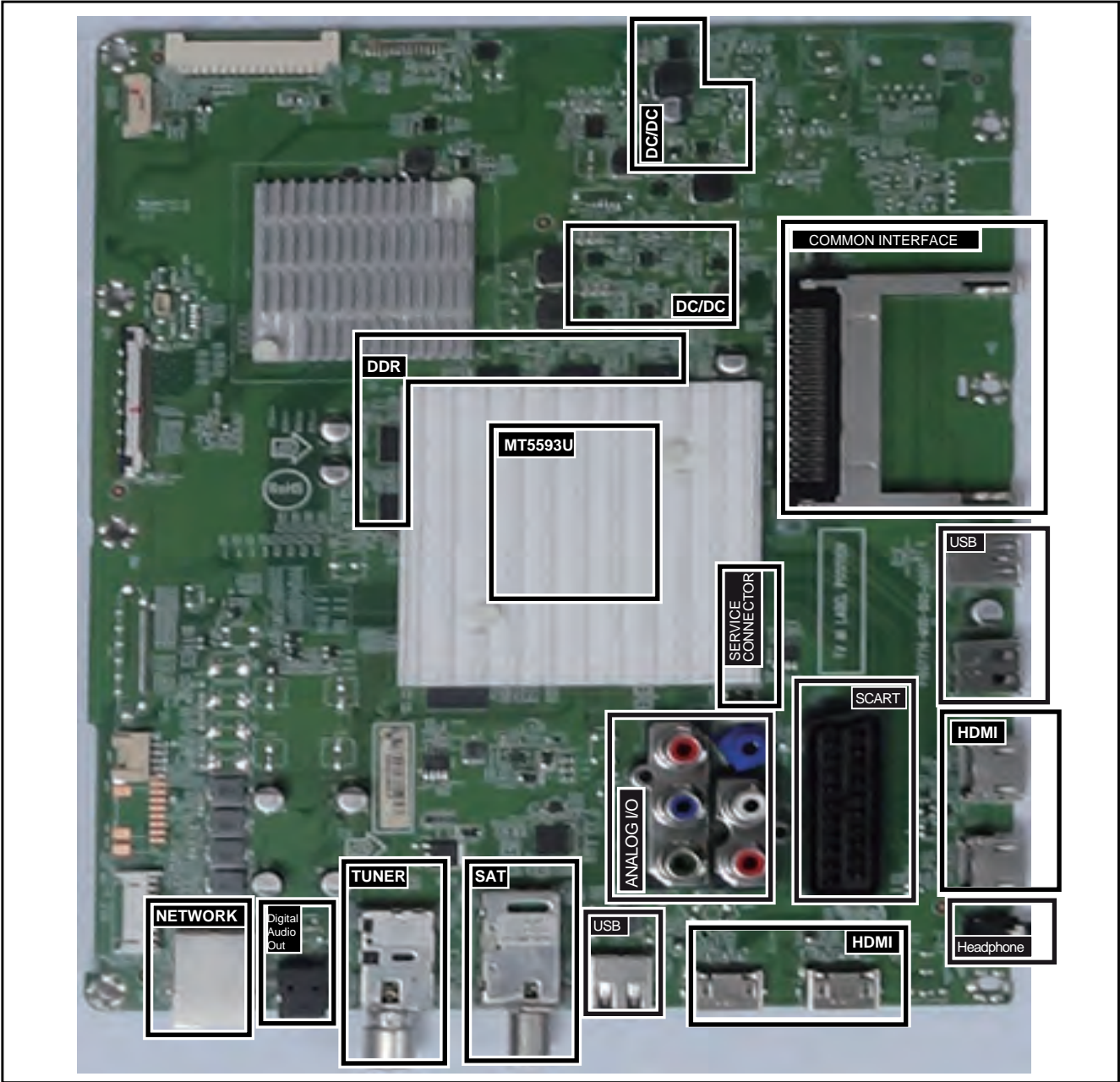
Key components of this chassis are:

- SCALER MT5593UGIJ HSBGA-900
- DRAM K4B2G1646E-BCMA 4Gb FBGA-96
- DRAM K4B4G1646G-BCK0 1600Mhz 1GB
- TUNER EUROPE TDSY-G480D
- TUNER EUROPE TDQS-A701F
- DEMODULATOR Si2168-C50-GMR QFN-48
- AUDIO Amplifier. TAS5760LDDCAR 20W TSSOP-48

7.1.2 QM16.3E LA Architecture Overview

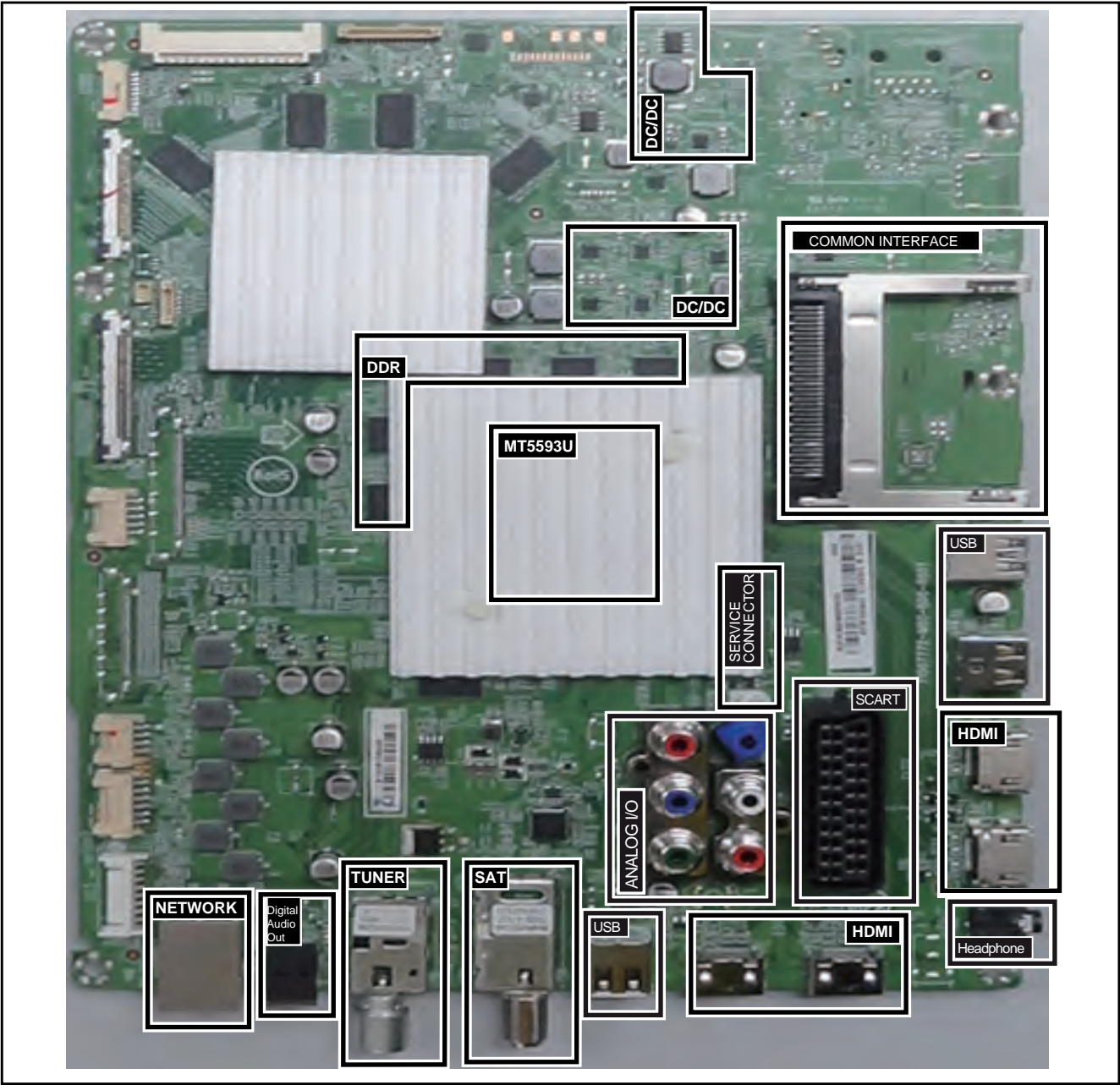
For details about the chassis block diagrams refer to [9. Block Diagrams](#). An overview architecture can be found in [Figure 9.1](#) and [Figure 9.2](#).

7.1.3 SSB Cell Layout



20030_200.eps

Figure 7-1 SSB layout cells (top view) (For 64x1 series)

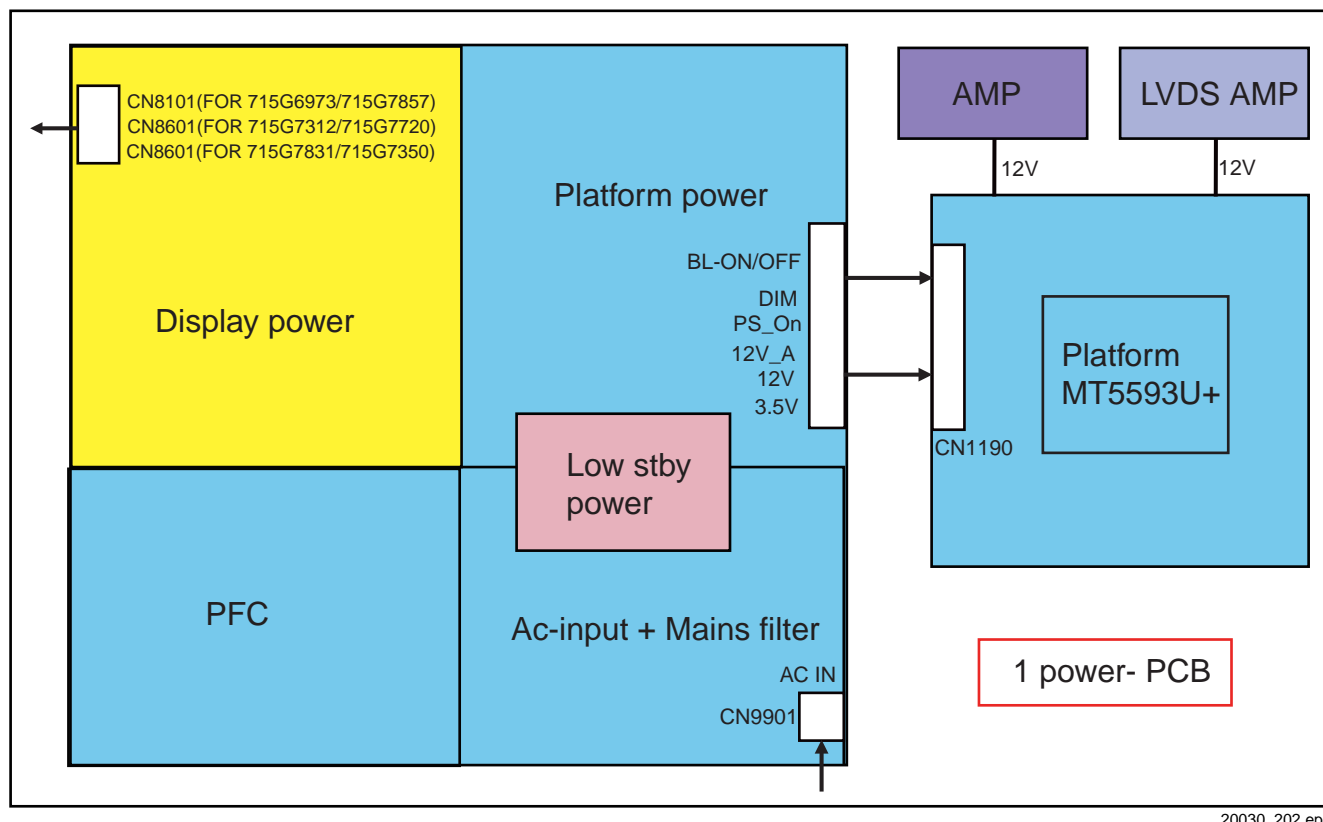


20030_201.eps

Figure 7-2 SSB layout cells (top view) (For 65x1/71x1 series)

7.2 Power Supply

Refer to figure [Figure 7-3](#) for the power architecture of this platform.



20030_202.eps

Figure 7-3 Power Architecture

7.2.1 Power Supply Unit

All power supplies are a black box for Service. When defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market. Consult the Philips Service web portal for the order codes of the boards.

Important delta's with the QM16.3E LA classis platform are:

- New power architecture for LED backlight
- "Boost"-signal is now a PWM-signal + continuous variable.

The control signals are:

- PS-ON
- Lamp "on/off"
- DIM (PWM) (not for PSDL)

In this manual, no detailed information is available because of design protection issues.

The output voltages to the chassis are:

- +3.5V output (standby mode)
- +12 output (on-mode)
- +12V_audio (audio AMP power)
- 42V(Boost for backlight for 715G7857)
- 70V(Boost for backlight for 715G7720)
- 48V(Boost for backlight for 715G6973)
- 48V(Boost for backlight for 715G7312)
- 77V(Boost for backlight for 715G7831)
- Output to the display; in case of
 - IPB: High voltage to the LCD panel
 - PSL and PSLS (LED-driver outputs)
 - PSDL (high frequent) AC-current.

7.2.2 Diversity

The diversity in power supply units is mainly determined by the diversity in displays.

The following displays can be distinguished:

- CCFL/EEFL backlight: power panel is conventional IPB
- LED backlight:
 - side-view LED without scanning: PSL power panel
 - side-view LED with scanning: PSLS power panel
 - direct-view LED without 2D-dimming: PSL power panel
 - direct-view LED with 2D-dimming: PSDL power panel.

PSL stands for **P**ower **S**upply with integrated **L**ED-drivers.

PSLS stands for a **P**ower **S**upply with integrated **L**ED-drivers with added **S**canning functionality (added microcontroller).

PSDL stands for a **P**ower **S**upply for **D**irect-view **L**ED backlight with 2D-dimming.

7.2.3 Connector overview

Table 7-1 Connector overview

Connector												
	715g7857		715g6973		715g7720		715g7312		715g7831		715g7350	
Number	CN9101	CN8101	CN9101	CN8101	CN9101	CN8601	CN9101	CN8601	CN9101	CN8601	CN9101	CN8601
Description	to SSB	to panel	to SSB	to panel	to SSB	to panel	to SSB	to panel	to SSB	to panel	to SSB	to panel
Pin	16	12	16	12	16	12	16	12	16	12	16	12
1	DIM	VLED+	DIM	+VLED	DIM	VLED+	DIM	VLED	DIM	VLED	DIM	+VLED
2	On/off	n.c.	On/off	n.c.	On/off	n.c.	On/off	VLED	On/off	VLED	BL_O/F	+VLED
3	PS_ON	-VLED_1	PS_ON	-VLED1	PS_ON	LED	PS_ON	-VLED_1	PS_ON	-VLED_2	PS_ON	-VLED1
4	3D_ON	-VLED_1	3D_ON	-VLED1	n.c.	LED	3D_ON	-VLED_1	3D	-VLED_2	3D_ON	-VLED1
5	GND	-VLED_1	GND	-VLED1	GND	LED	GND	-VLED_1	GND	-VLED_2	GND	-VLED1
6	GND	n.c.	GND	n.c.	GND	n.c.	GND	-VLED_1	GND	-VLED_2	GND	-VLED1
7	GND	n.c.	GND	n.c.	GND	n.c.	GND	-VLED_2	GND	-VLED_1	GND	-VLED2
8	GND	-VLED_2	GND	-VLED2	GND	LED	GND	-VLED_2	GND	-VLED_1	GND	-VLED2
9	+12V-A	-VLED_2	+12V-A	-VLED2	+12V-A	LED	+12V	-VLED_2	+12V	-VLED_1	12V/16V_A	-VLED2
10	+12V-A	-VLED_2	+12V-A	-VLED2	+12V-A	LED	+12V	-VLED_2	+12V	-VLED_1	12V/16V_A	-VLED2
11	+12V	n.c.	+12V	n.c.	+12V	n.c.	+12V	VLED	+12V	VLED	12V/16V	+VLED
12	+12V	VLED+	+12V	VLED+	+12V	VLED+	+12V	VLED	+12V	VLED	12V/16V	+VLED
13	+12V	-	+12V	-	+12V	-	+12V	-	+12V	-	12V/16V	-
14	+12V	-	+12V	-	+12V	-	+12V	-	+12V	-	12V/16V	-
15	+3.5/+5v	-	+3.5	-	+3.5	-	+5V	-	+5V	-	+3.5V/+5V	-
16	+3.5/+5v	-	+3.5	-	T-CON-O/F	-	+5V	-	+5V	-	+3.5V/+5V	-

7.3 DC/DC Converters

The on-board DC/DC converters deliver the following voltages (depending on set execution):

- +STB_PWR, permanent voltage for the Stand-by Power system and WIFI.
- +3V3SB, voltage for scaler, EMMC, IR/LED reciver, Key board
- +12V, input from the power supply for the panel common(active mode)
- +12V, input from the power supply for LNB supply
- LDO_PWR, DVDD3V3, voltage for EMMC when TV on
- DDRV, VCCK, voltage for DDR
- AVD3V3, AVDD1V0, supply voltage for scaler MT5593
- +5V_SW, USB port supply voltage
- +3V3_TUNER, supply voltage for tuner
- +5V-USB, input intermediate supply voltage for USB Power
- PVDD from the power +12V_AU for the AUDIO AMP
- DV12, +3.3V_T2, +3.3VA_T2 voltage for Demodulator IC channel
- Wi-Fi_VCC, voltage for WIFI

Figures gives a graphical representation of the DC/DC converters with its current consumptions :

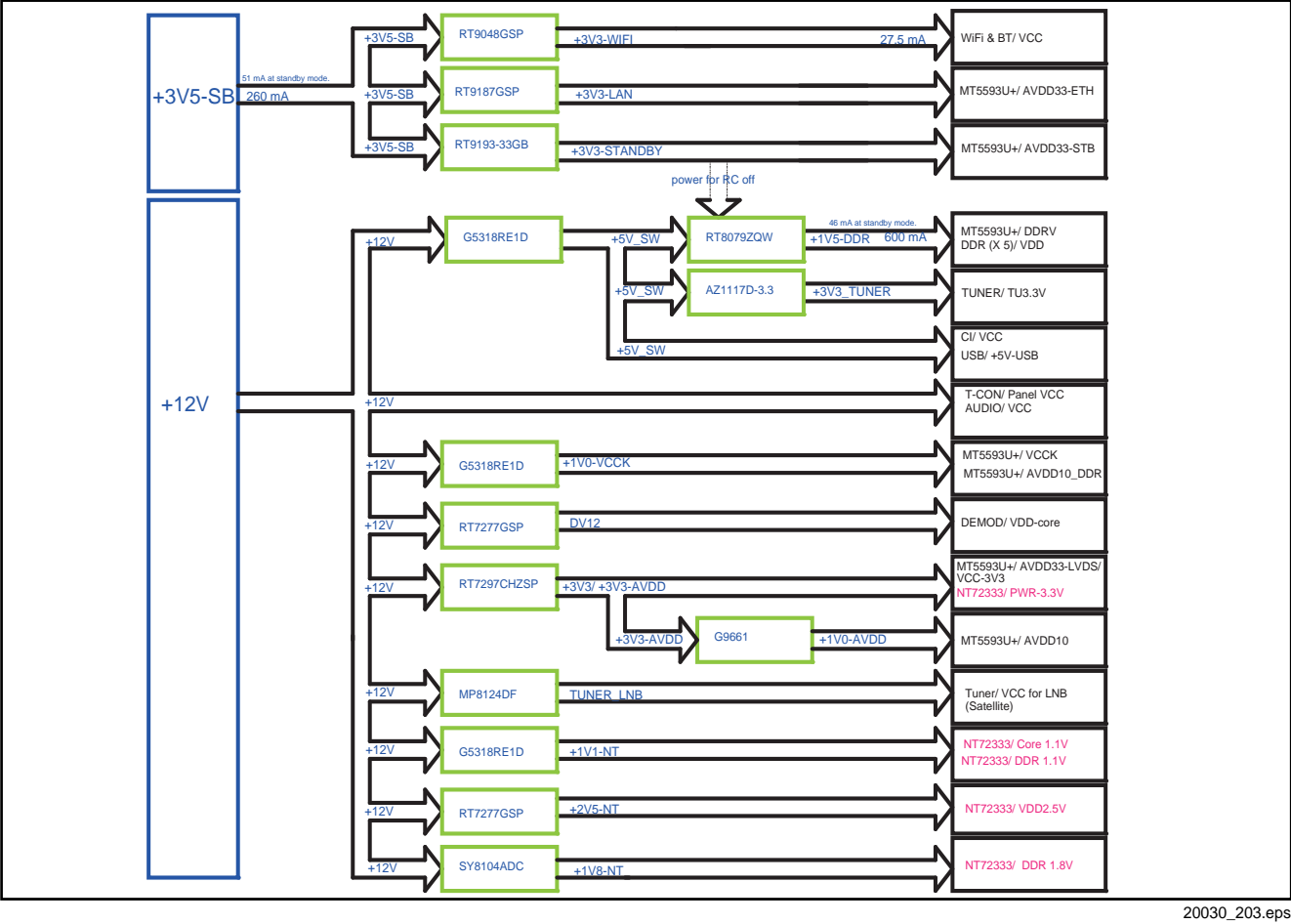
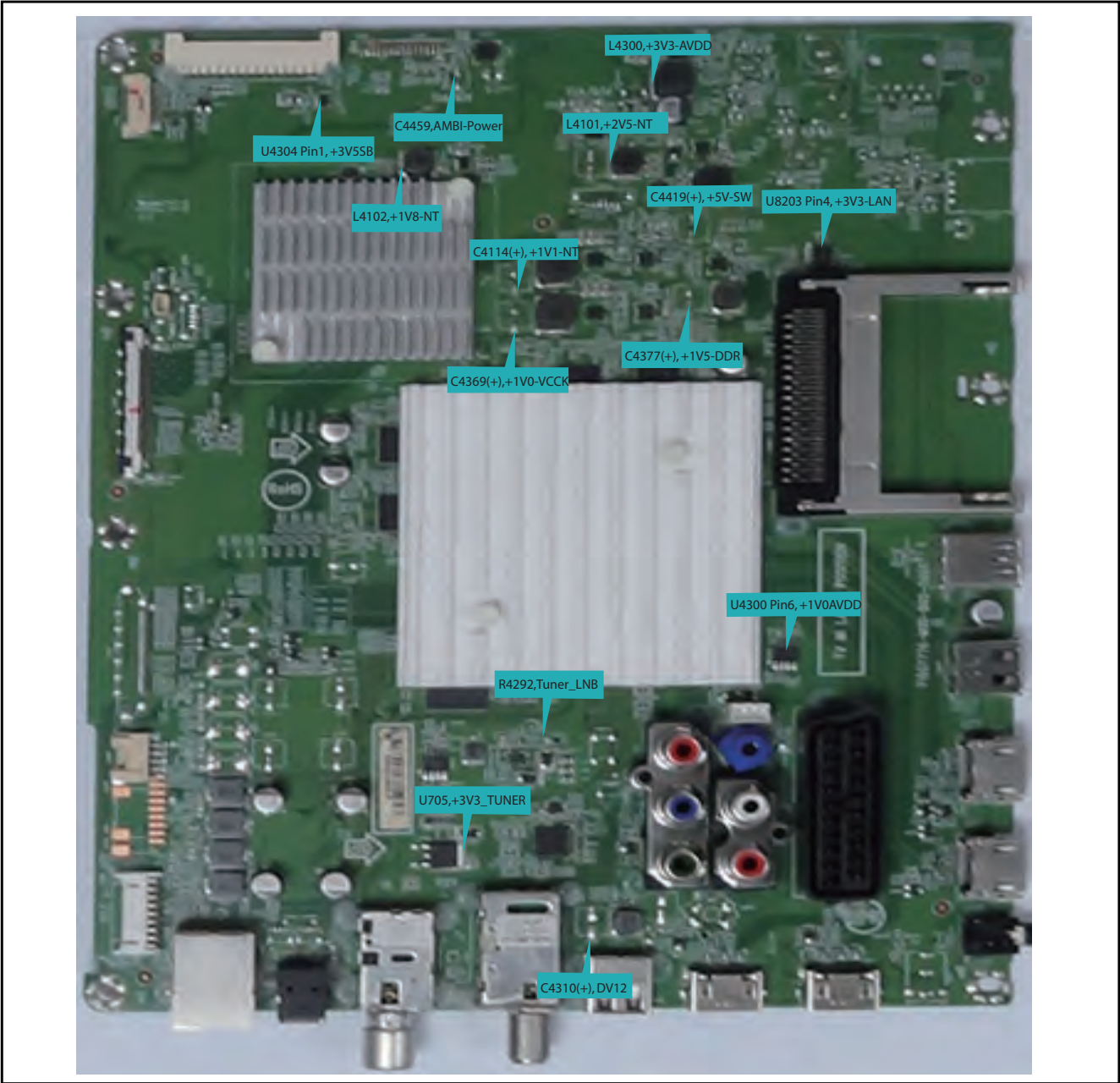


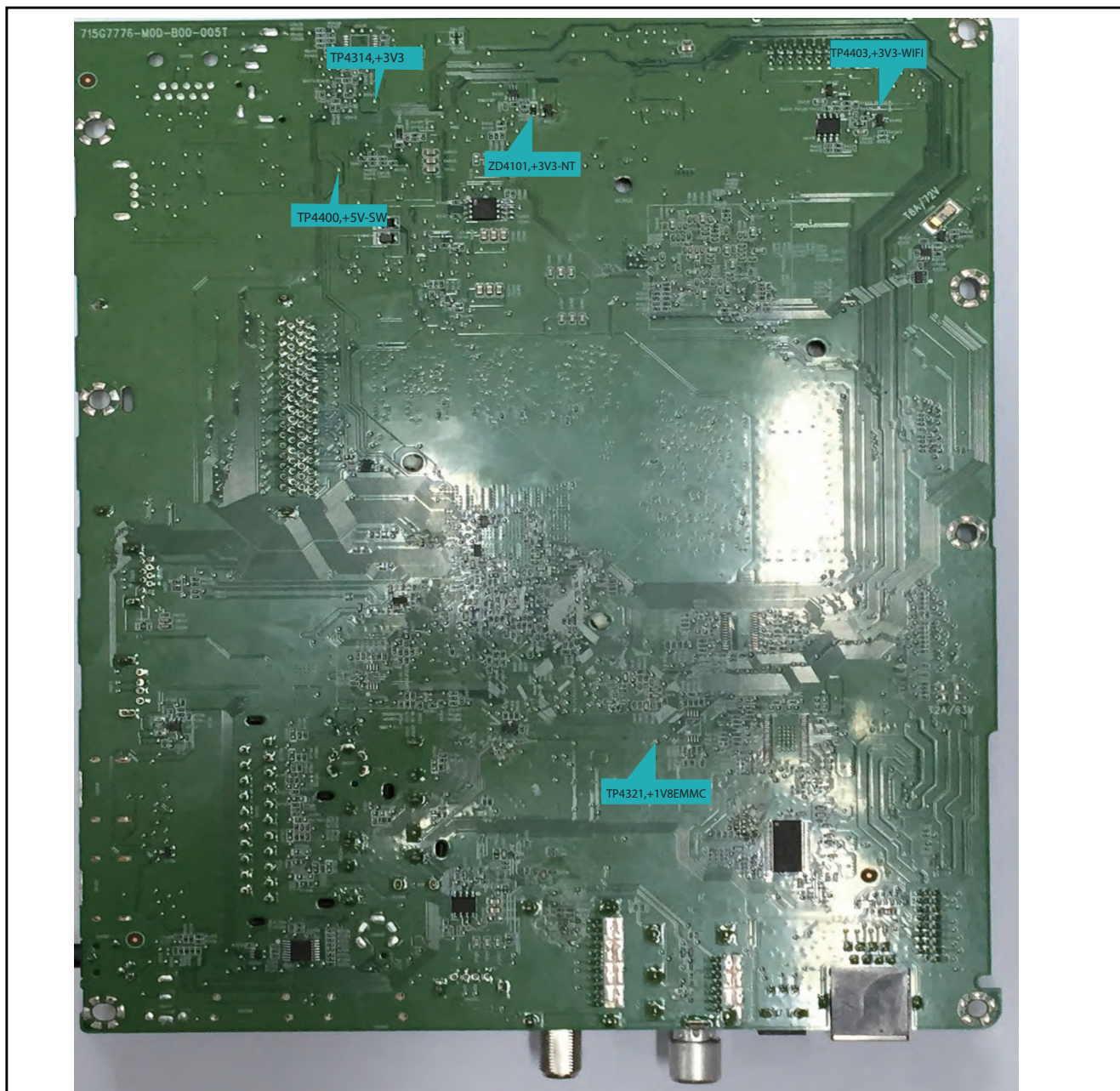
Figure 7-4 DC/DC converters

7.3.1 Power layout SSB



20030_208.eps

Figure 7-5 Power SSB Top View



20030_209.eps

Figure 7-6 Power SSB Bottom View

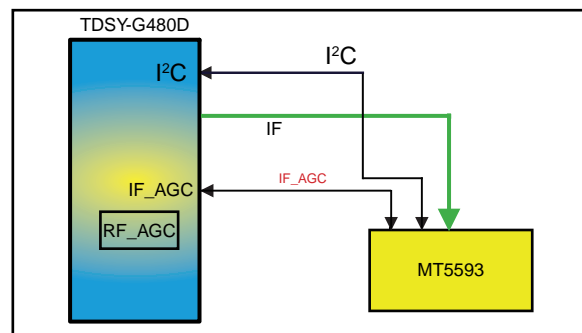
7.4 Front-End Analogue and DVB-T, DVB-C; ISDB-T reception

7.4.1 Front-End Analogue part

The Front-End for analogue tuner consist of the following key components:

- TUNER EUROPE TDSY-G480D
- SCALER MT5593UGIJ HSBGA-900 Processor

Below find a block diagram of the front-end application for analogue part.



20030_204.eps

Figure 7-7 Front-End Analogue block diagram

7.4.2 DTV-T2 part

The Front-End for DVT part consist of the following key components:

- TUNER EUROPE TDSY-G480D
- SCALER MT5593UGIJ HSBGA-900 Processor
- DEMODULATOR Si2169-C50-GMR QFN-48

Below find a block diagram of the front-end application for DTV part.

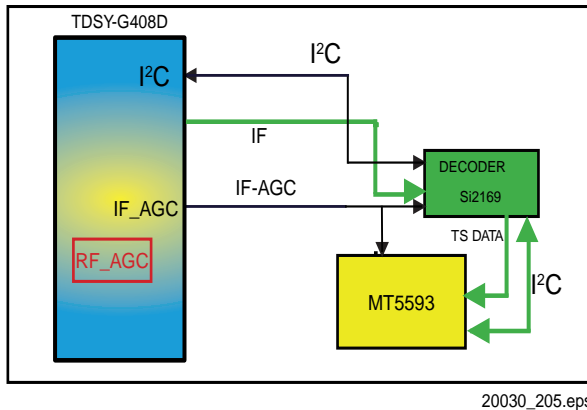


Figure 7-8 Front-End DVB-T2 DTV block diagram

7.5 Front-End DVB-S(2) reception

The Front-End for the DVB-S(2) application consist of the following key components:

- TUNER EUROPE TDQS-A701F
- SCALER MT5593UGIJ HSBGA-900
- DEMODULATOR SI2169-C50-GMR QFN-48

Below find a block diagram of the front-end application for DVB-S(2) reception.

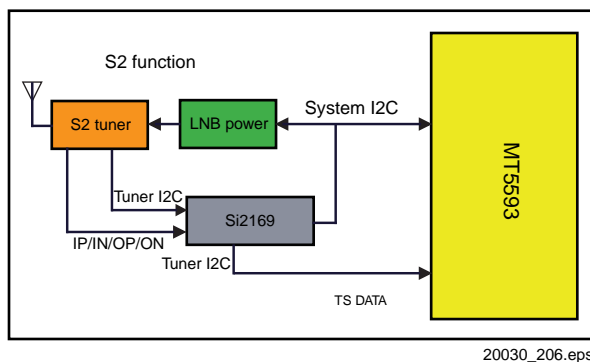


Figure 7-9 Front-End DVB-S2 DTV block diagram

The application supports the following protocols:

- Polarization selection via supply voltage (18V = horizontal, 13V = vertical)
- Band selection via "toneburst" (22kHz): tone "on" = "high" band, tone "off" = "low" band
- Satellite (LNB) selection via DiSEqC 2.0 protocol
- Reception of DVB-S (supporting QPSK encoded signals) and DVB-S2 (supporting QPSK, 8PSK encoded signals)

7.6 HDMI

Refer to figure [7-10 HDMI input configuration](#) for the application.

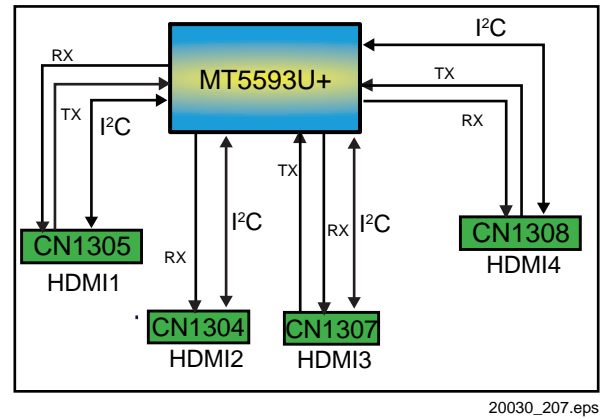


Figure 7-10 HDMI input configuration

The following HDMI connector can be used:

- HDMI 1: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
- HDMI 2: HDMI input (TV digital interface support HDCP) with digital audio/PC DVI input/ARC
- HDMI 3: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
- HDMI 4: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
- +5V detection mechanism
- Stable clock detection mechanism
- MHL 2.0 function only for HDMI4
- Audio return channel(ARC)
- HPD control
- CEC control

7.7 Video and Audio Processing - MT5593UGIJ

The MT5593UGIJ is the main audio and video processor (or System-on-Chip) for this platform. It has the following features:

- ATSC /DVB-T /DVB-C/DTMB demodulators
- True 120HZ Full HD MJC
- Power CPU core
- 3D graphic support OpenGL ES 1.1/2.0
- A multi-standard video decoder
- A transport de-multiplexer
- One HDMI 2.0 receiver with 3D support
- MHL2.0& Standby charging
- 2D/3D converter
- Rich format audio codec
- Local dimming (LED backlight)
- Ethernet MAC+PHY
- TCON
- Panel overdrive control
- Four-link LVDS, mini-LVDS,V-by-one, EPI

The MT5593UGIJ family consists of a DTV front-end demodulator, a backend decoder and a TV controller and offers high integration for advanced applications. It integrates a transport de-multiplexer, a high definition video decoder, an audio decoder, a four-link LVDS transmitter, a mini-LVDS transmitter, a V-by-one transmitter, an EPI transmitter, and an NTSC/PAL/SECAM TV decoder with 3D comb filter(NTSC/PAL).

The MT5593UGIJ enables consumer electronics manufacturers to build high quality, low cost and feature-rich DTV.

The MT5593UGIJ family supports Full-HD MPEG1/2/4/H.264/VC1/RM/AVS/ and H.264/HEVC video decoder standards, and JPEG. The MT5593UGIJ also supports Media Tek MDDi de-interlace solution which can reach very smooth picture quality for motions. A 3D comb filter added to the TV decoder recovers great details for still pictures. The special color processing technology provides a natural,

deep colors and true studio quality video. Moreover, the MT5593 family has built-in high resolution and high-quality audio codec.

The MT5593UGIJ family provides consumers with and Full-HD 120Hz experience. It integrates high-quality Full-HD ME/MC technology.

The MT5593UGIJ family supports ASTC,DVB-T and DVB-C,DTMB demodulation functions. It reserves transport stream inputs for external demodulators for other countries or areas.TV maker can easily port the same UI to worldwide TV models. First-class adjacent and co-channel rejection capability grants excellent reception. Professional error-concealment provides stable, smooth and mosaic-free video quality

For a functional diagram of the MT5593UGIJ, refer to [Figure 8-1](#).

8. IC Data Sheets

This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

8.1 Diagram 10-11-1 SOC-EMMC, B01, MT5593UGIJ (IC U9400)

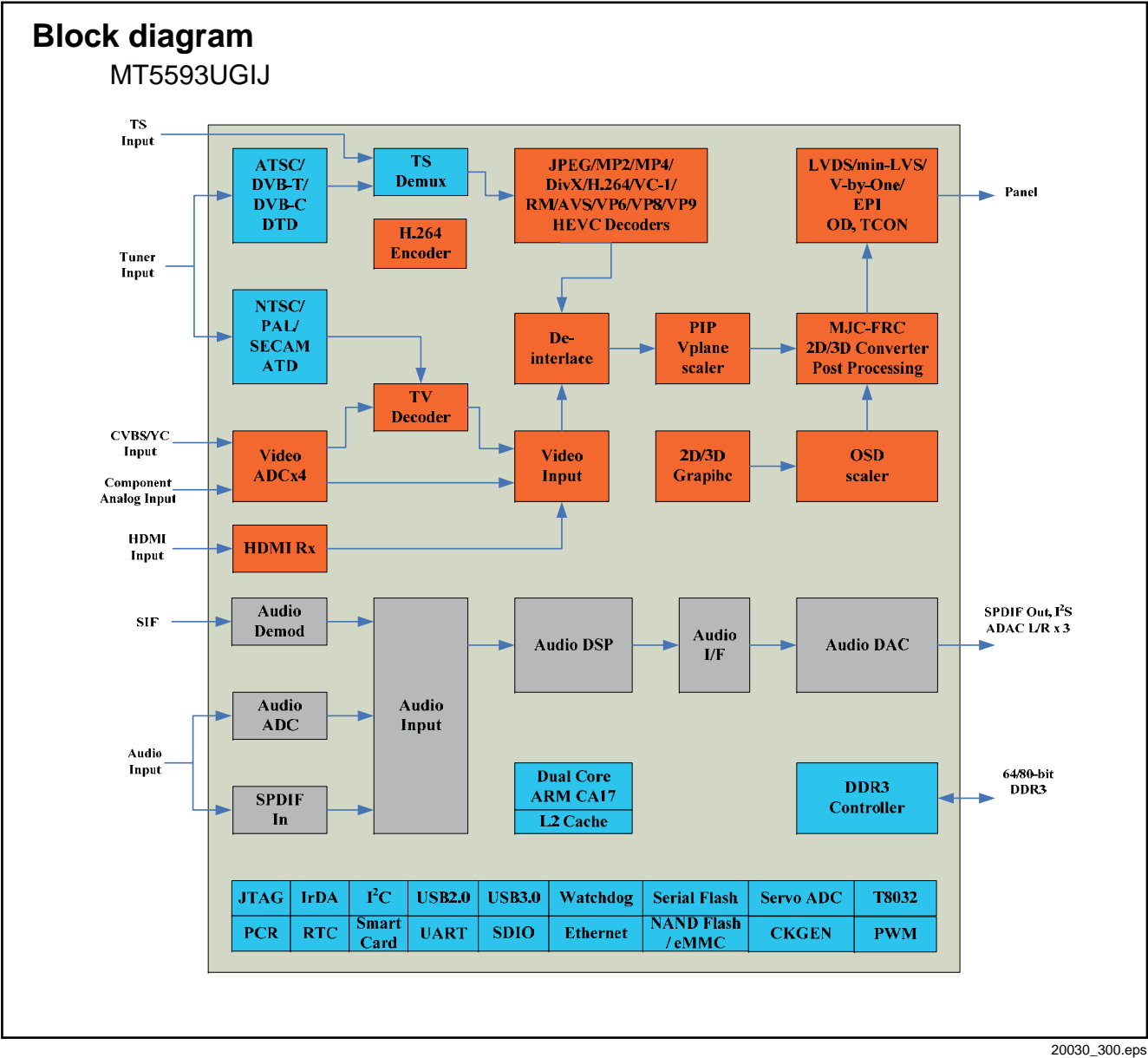


Figure 8-1 Internal block diagram

MT5593UGIJ

[illegible]

20030_301.eps

Figure 8-2 Internal pin configuration

8.2 Diagram [10-11-6 BE-NT324a-Vx1-INPUT](#), B06, NT72324BG-35 (IC U3100)

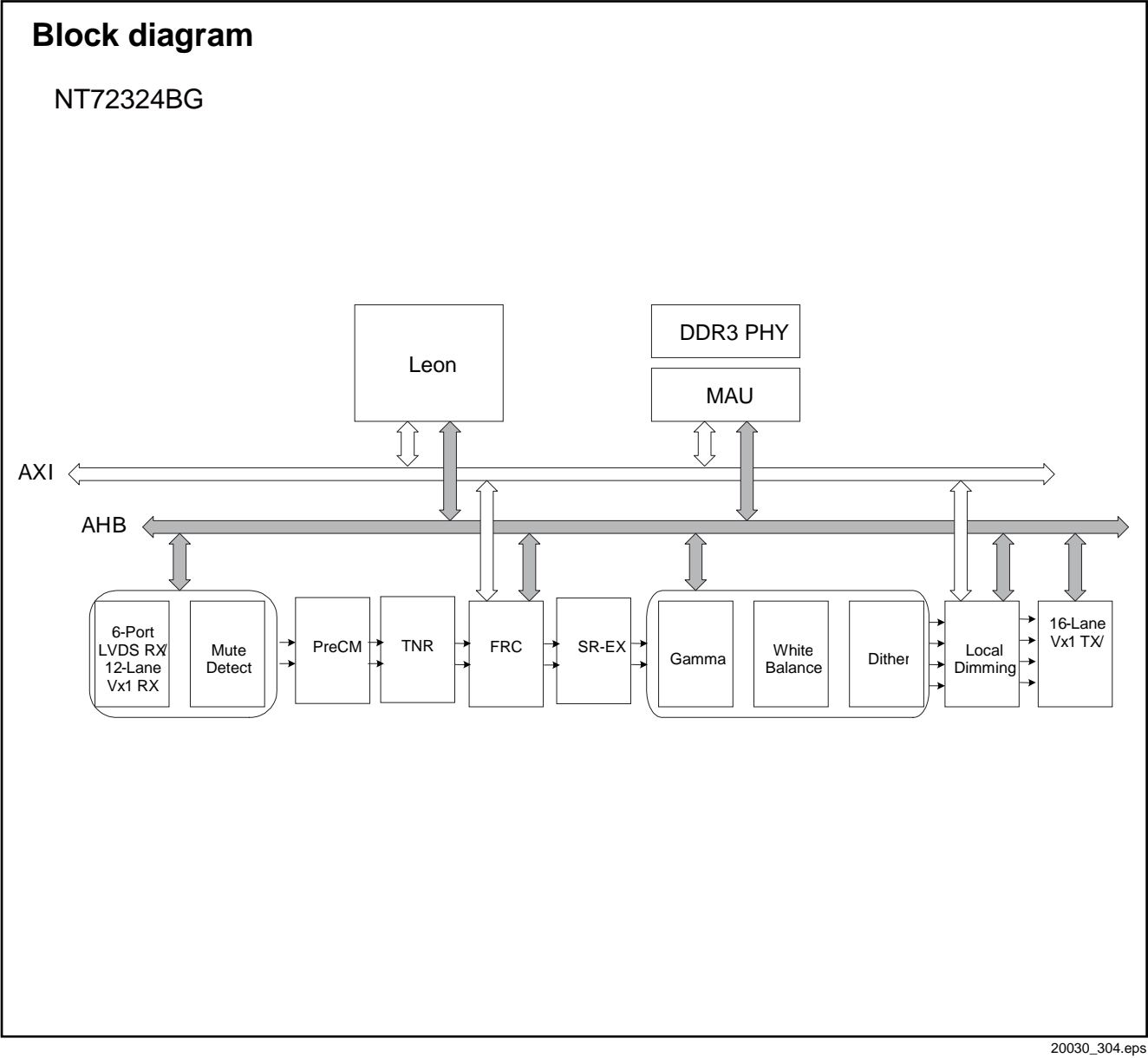
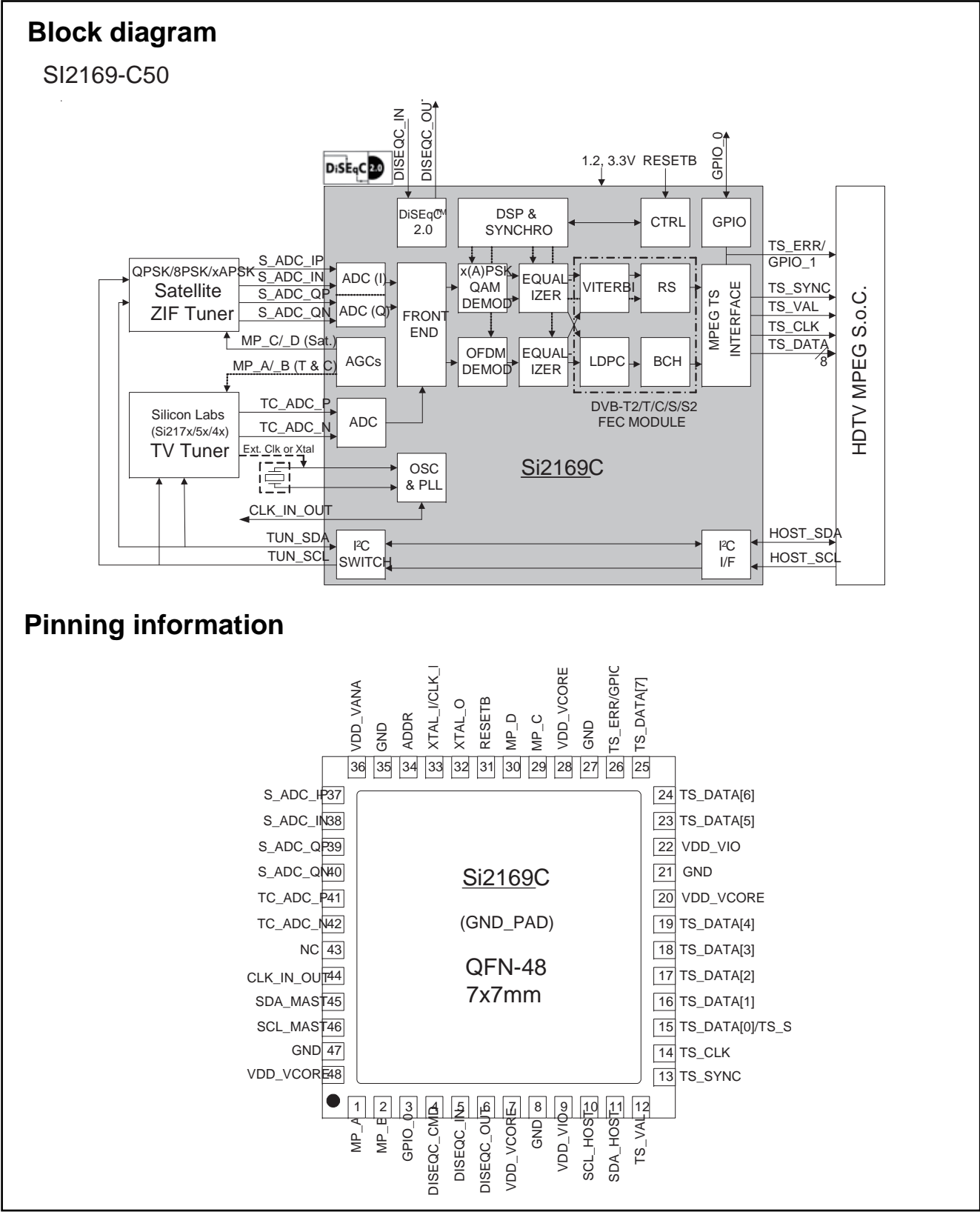


Figure 8-3 Internal block diagram and pin configuration

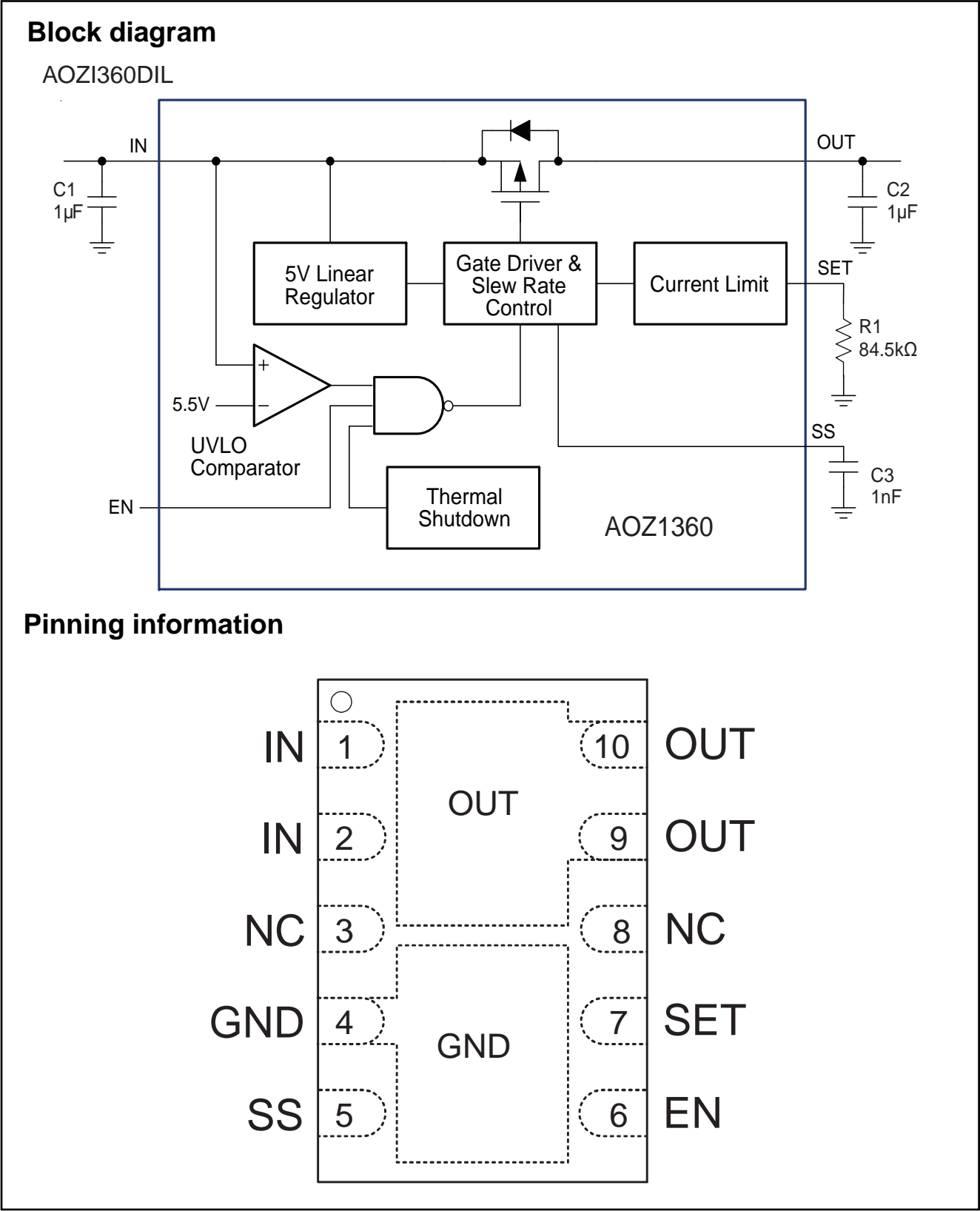
8.3 Diagram 10-11-5 FE-TUNER-DEMOD-TPV, B05, SI2169-C50 (IC U201)



20030_302.eps

Figure 8-4 Internal block diagram and pin configuration

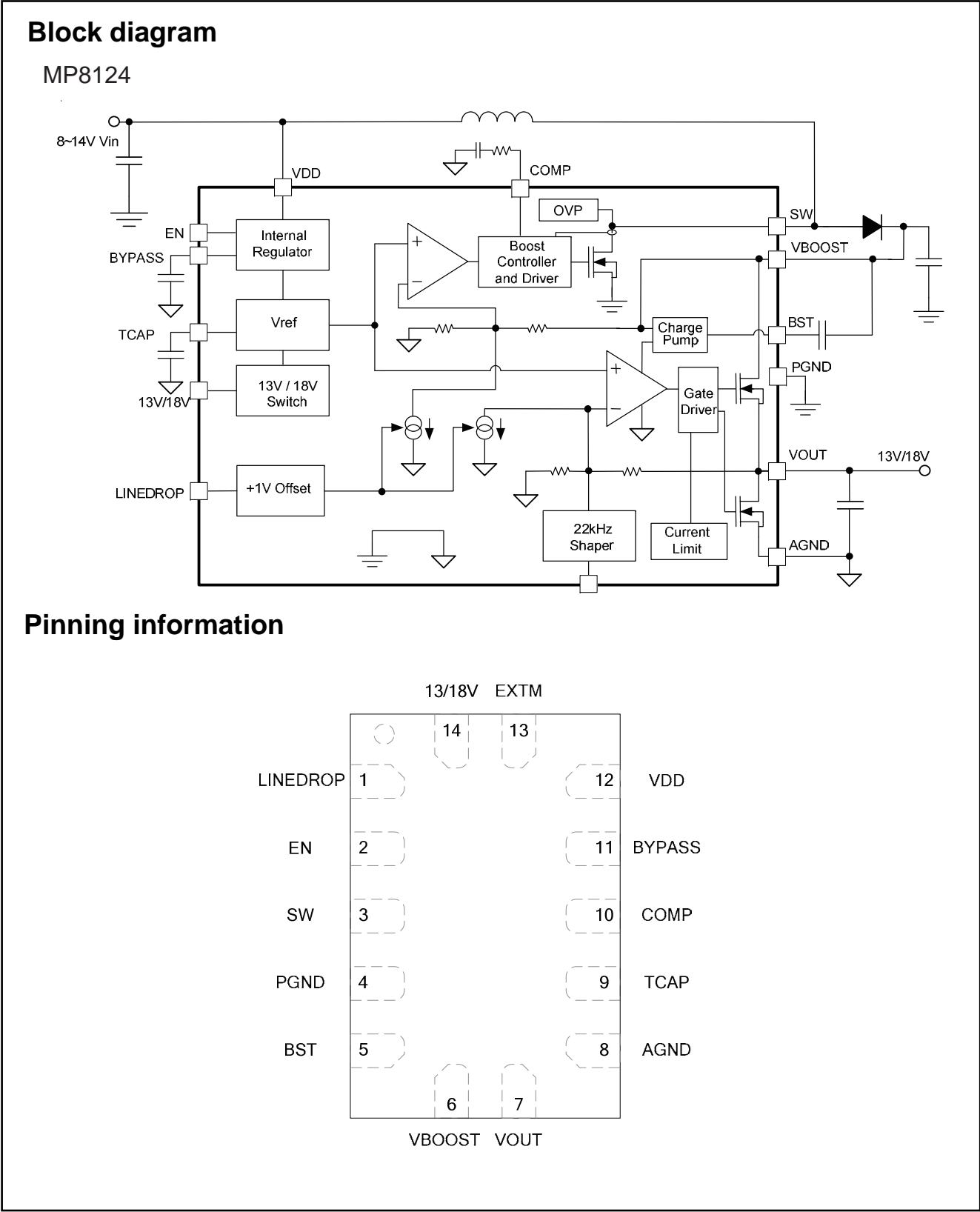
8.4 Diagram 10-11-15 DCDC-SYSTEM-POWER2, B15, AOZ1360DIL (IC U4405)



20030_303.eps

Figure 8-5 Internal block diagram and pin configuration

8.5 Diagram [10-11-15 DCDC-SYSTEM-POWER2, B15, MP8124GD \(IC U751\)](#)



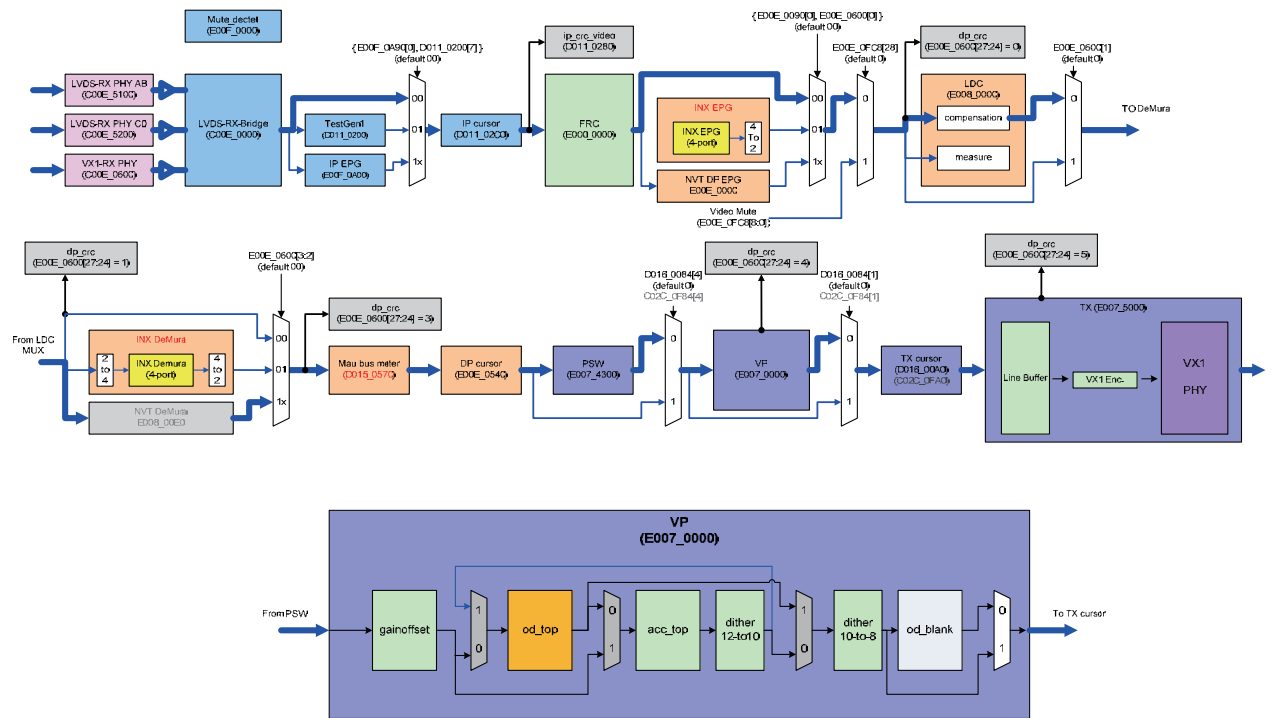
20030_305.eps

Figure 8-6 Internal block diagram and pin configuration

8.6 Diagram [10-10-6 BE-NT72333a-Vx1-INPUT](#), B06, NT72333TBG/C (IC U3100)

Block diagram

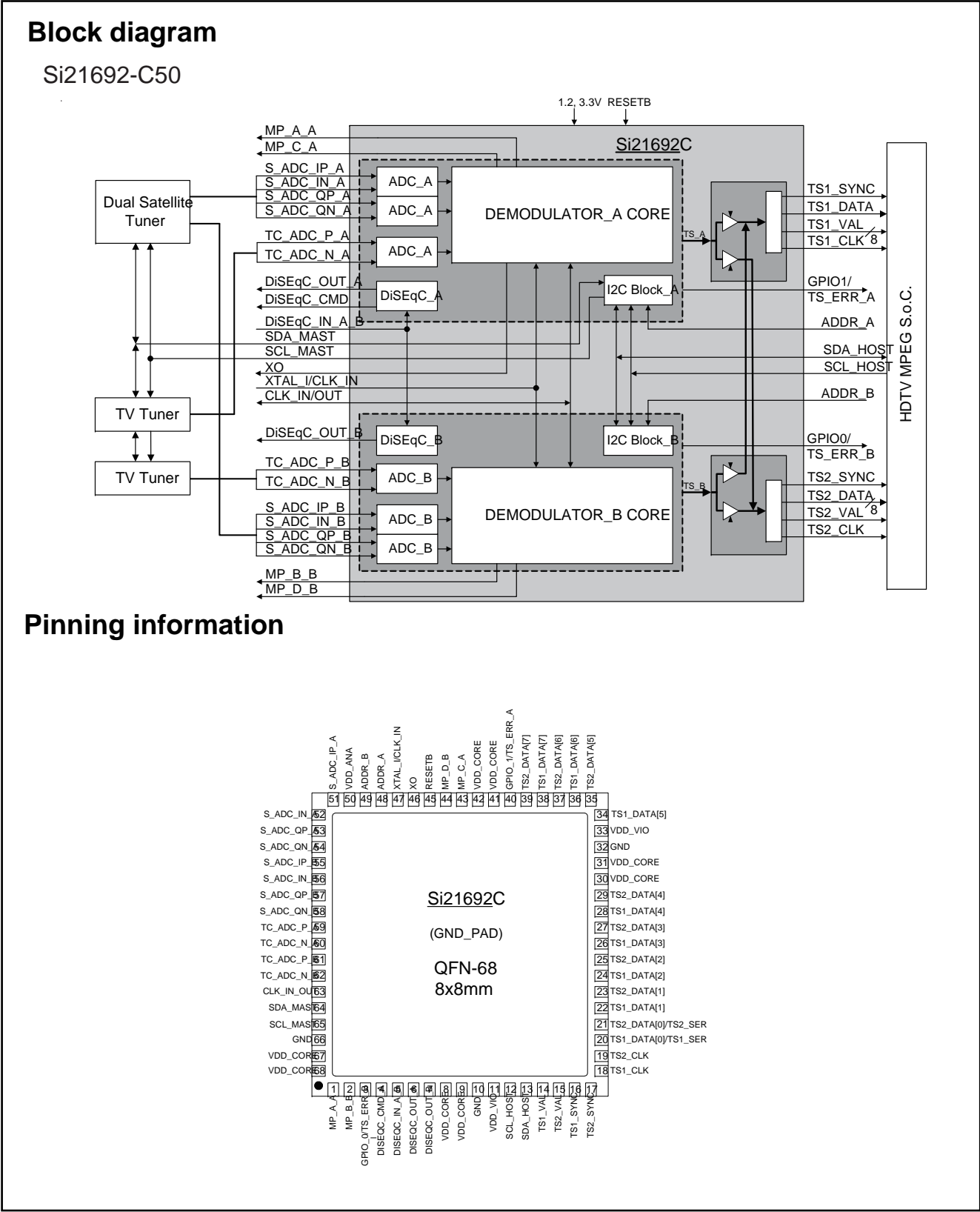
NT72333TBG



20030_306.eps

Figure 8-7 Internal block diagram and pin configuration

8.7 Diagram 10-10-14 DCDC-SYSTEM-POWER1, B14, G5318RE1D (IC U4306)



20130_300.eps

Figure 8-8 Internal block diagram and pin configuration

8.8 Diagram [10-11-15 DCDC-SYSTEM-POWER2](#), B15, RT8079GQW (IC U4302)

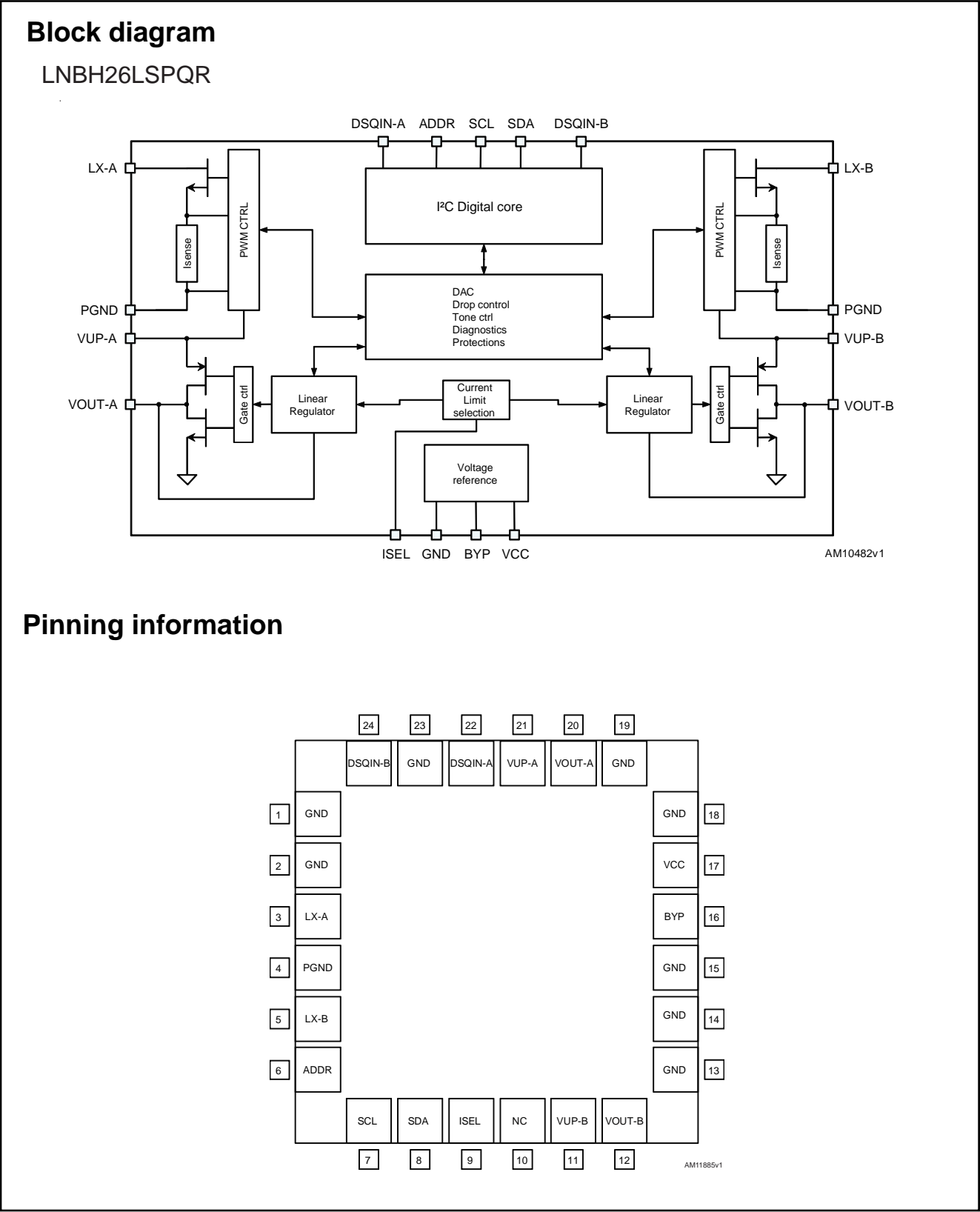
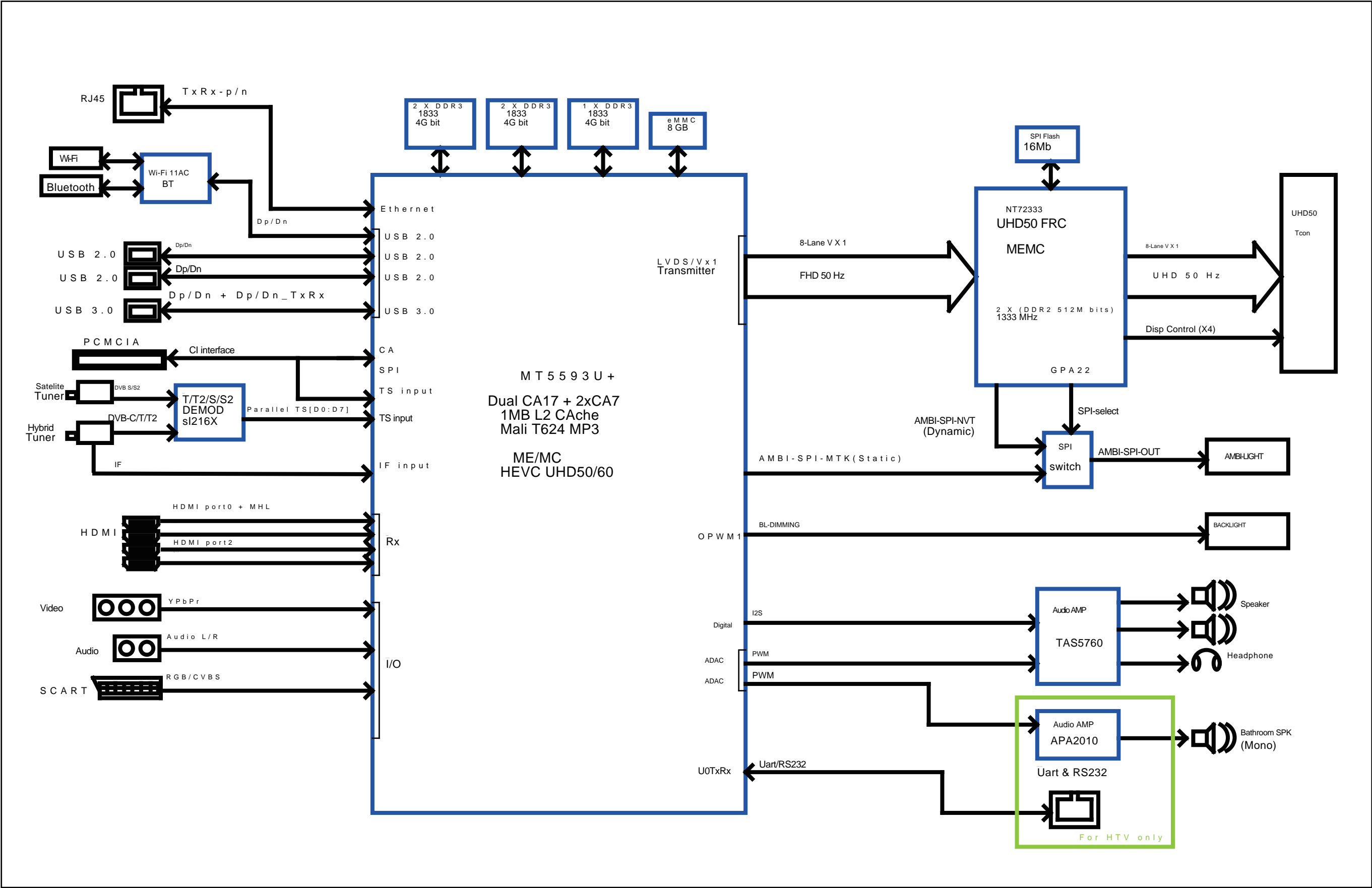


Figure 8-9 Internal block diagram and pin configuration

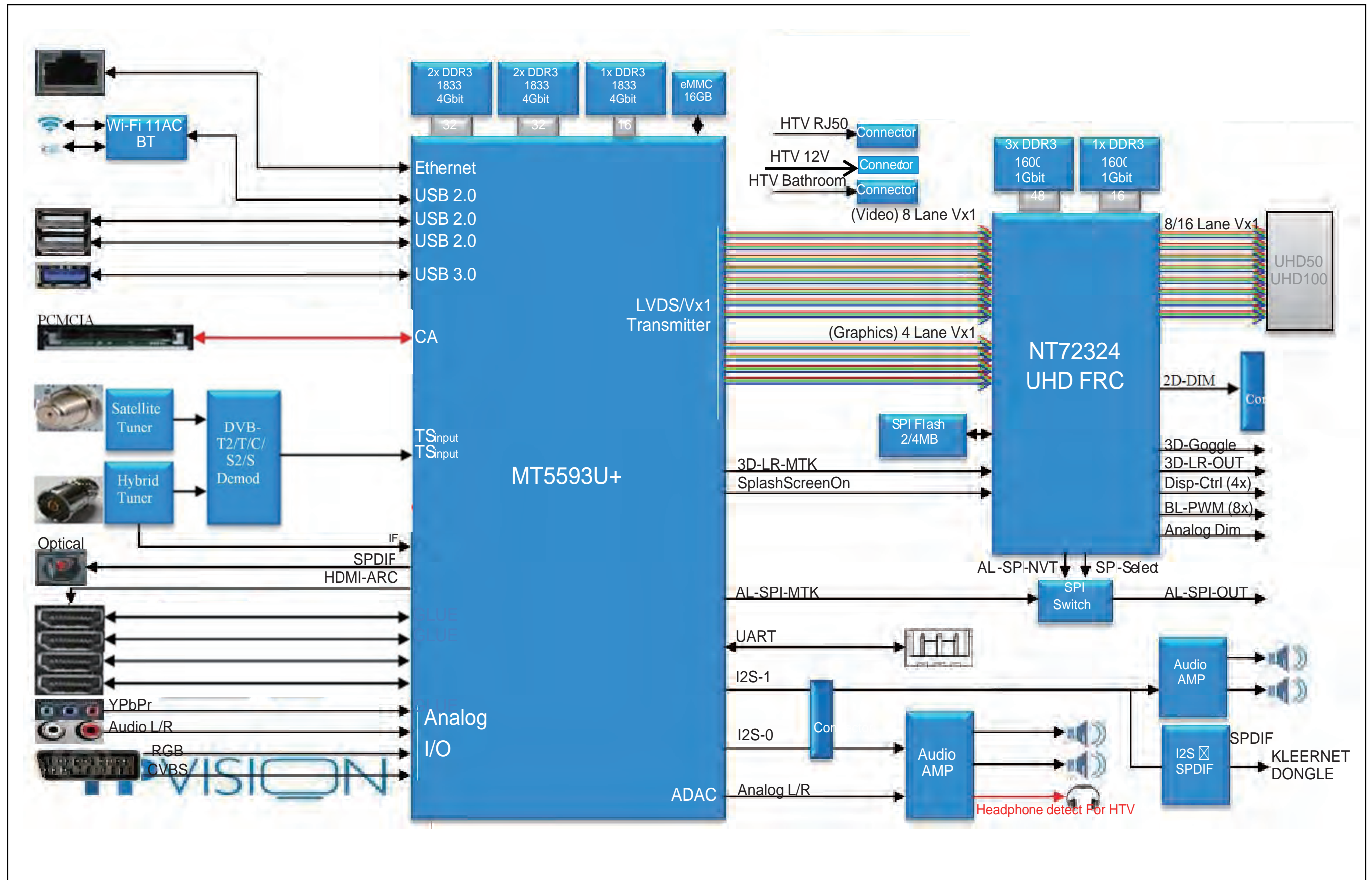
Personal Notes:

9. Block Diagrams

9.1 Block diagram 64x1 series



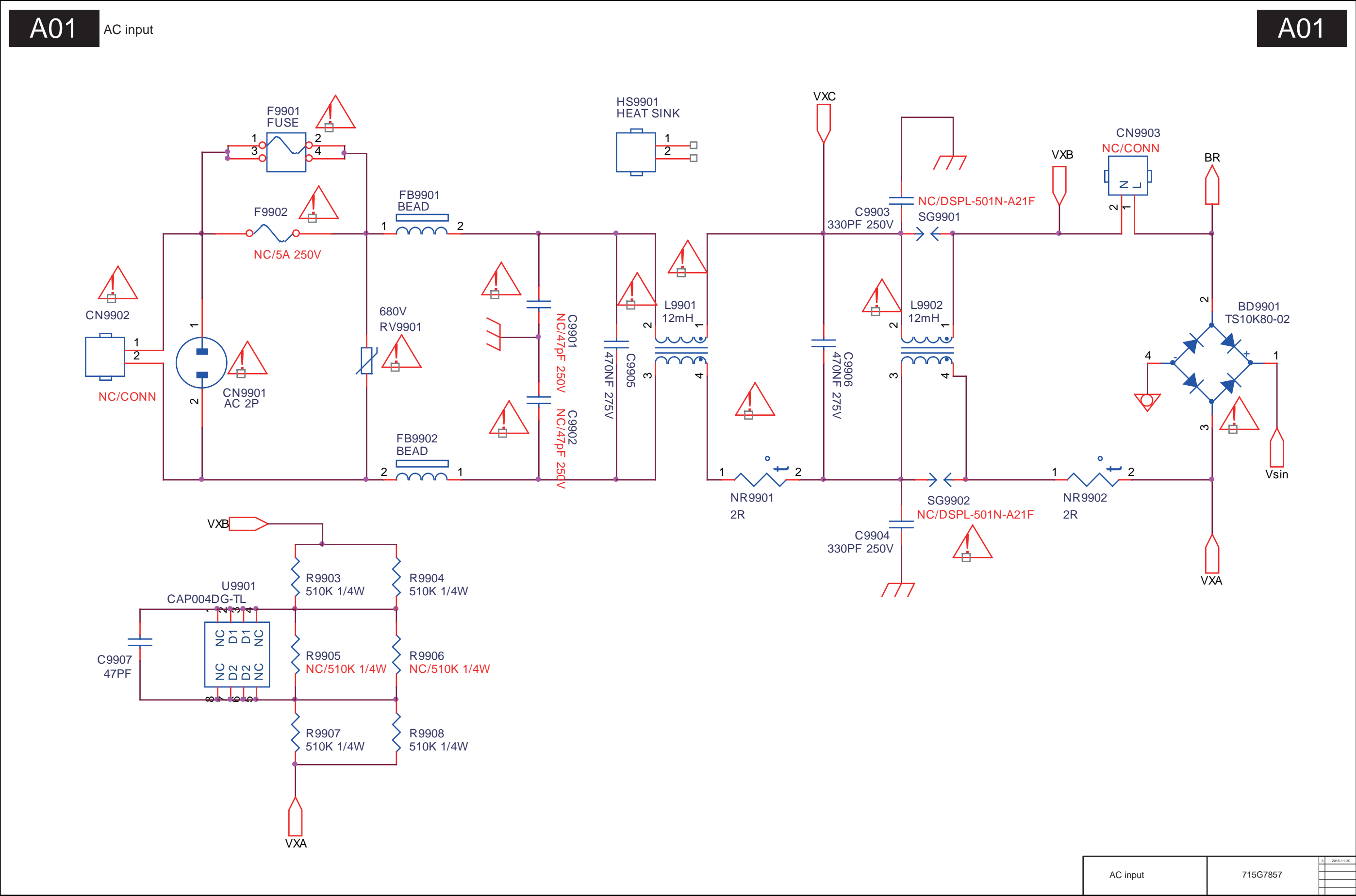
9.2 Block diagram 65x1/7xx1 series



20030_401.eps

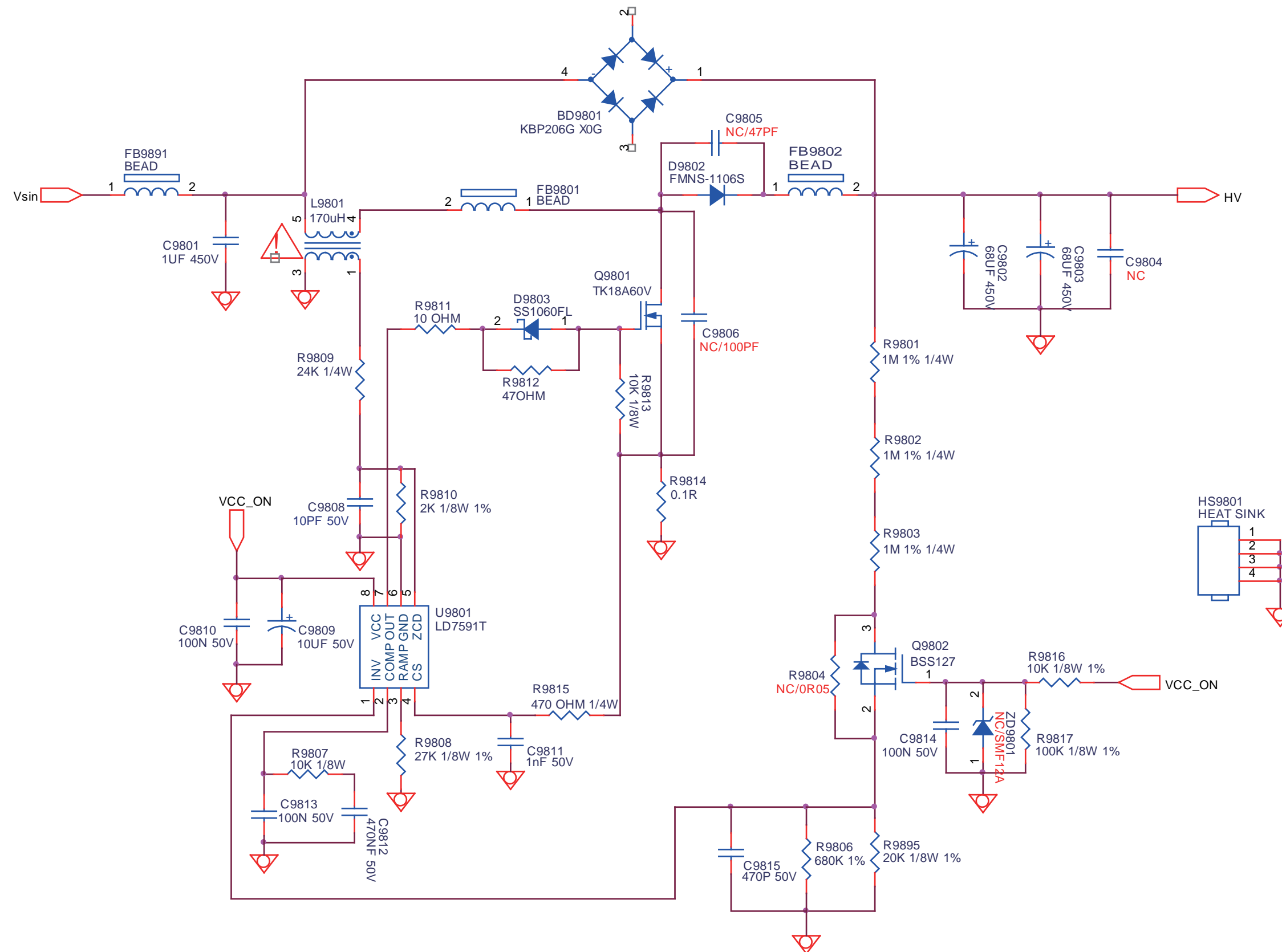
10. Circuit Diagrams and PWB Layouts

10.1 A 715G7857 PSU
10-1-1 AC input



PFC

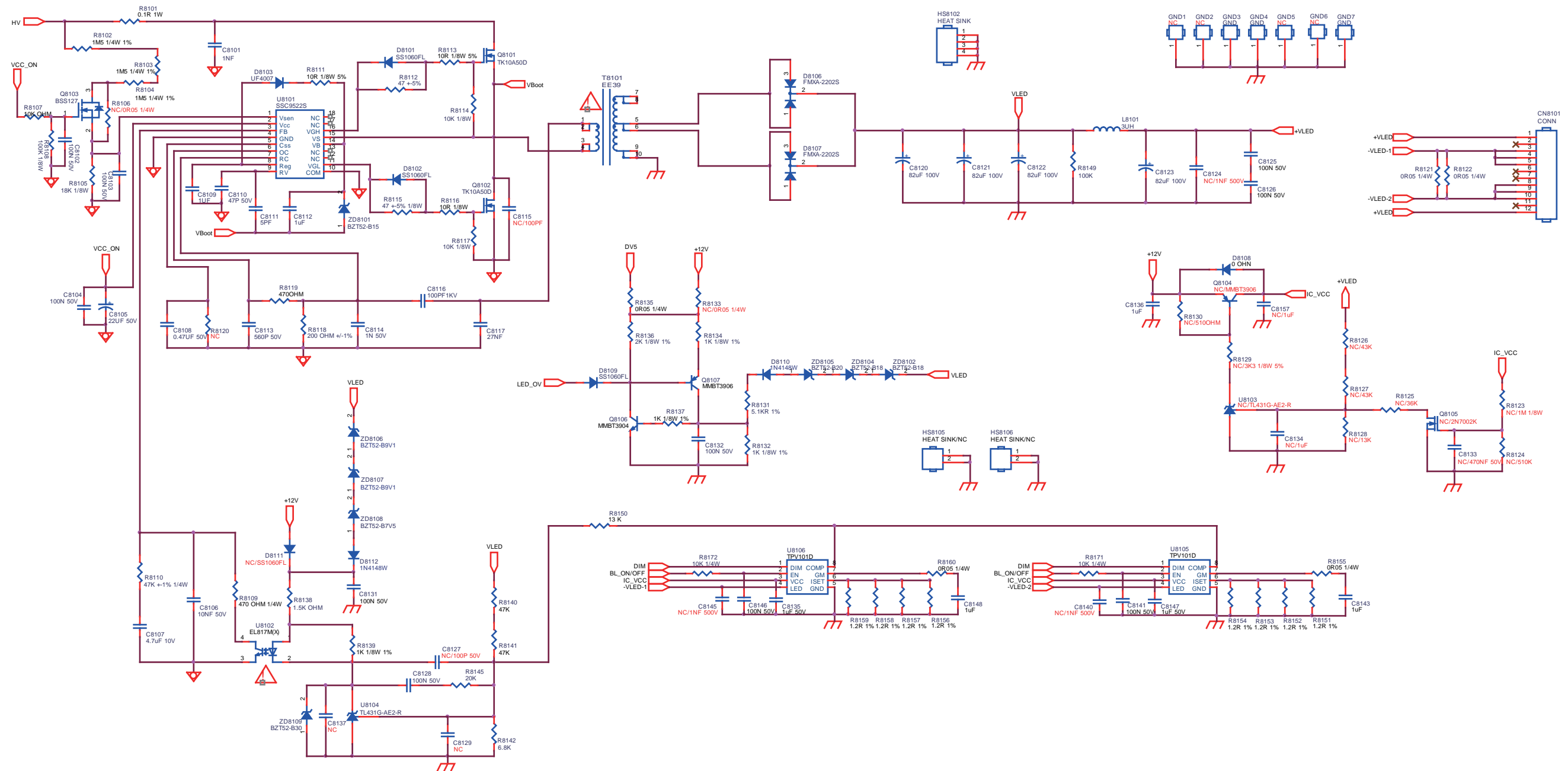
A02



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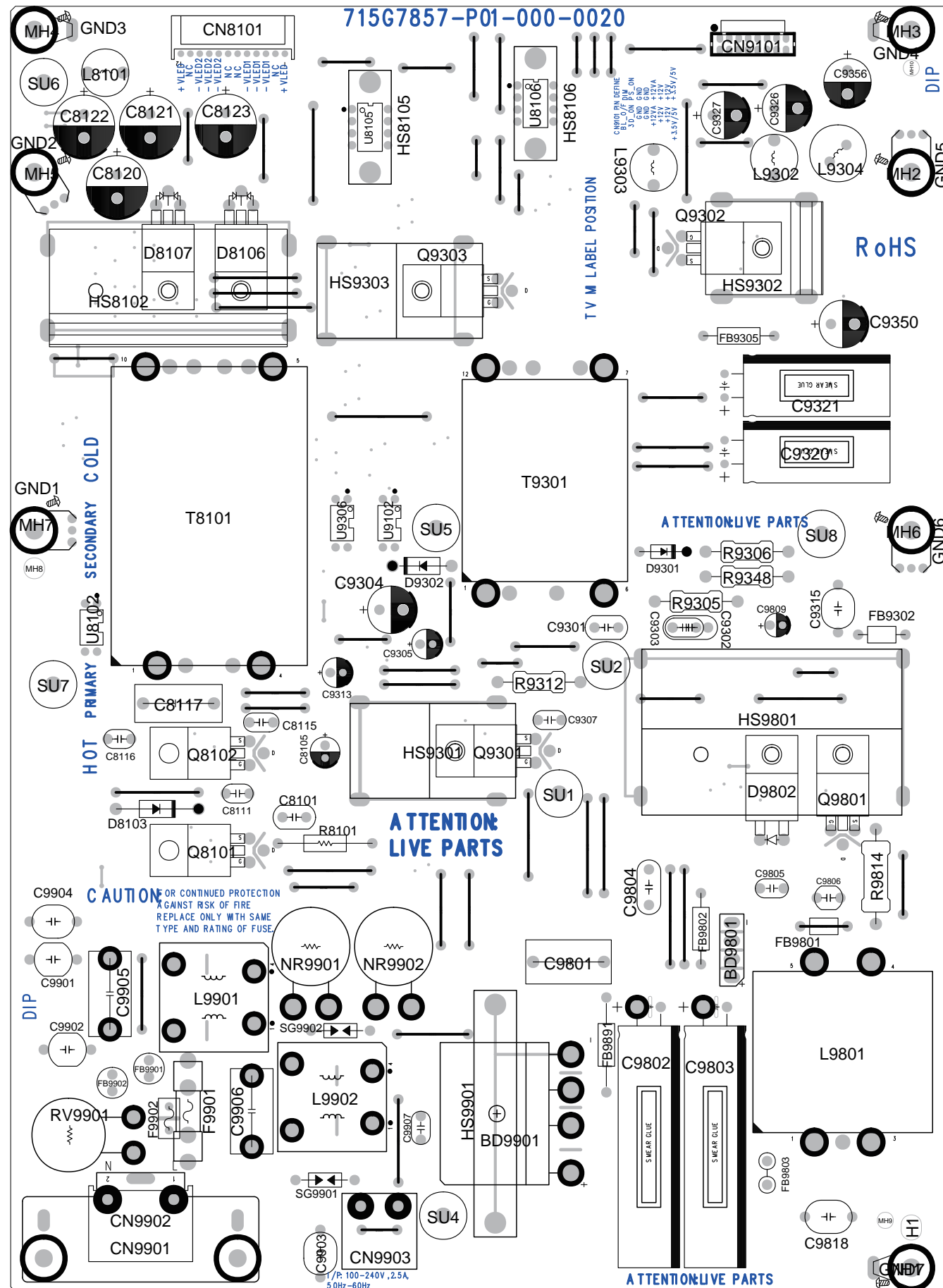
LED

A04



LED	715G7857	2015-11-23

10-1-5 Power layout top

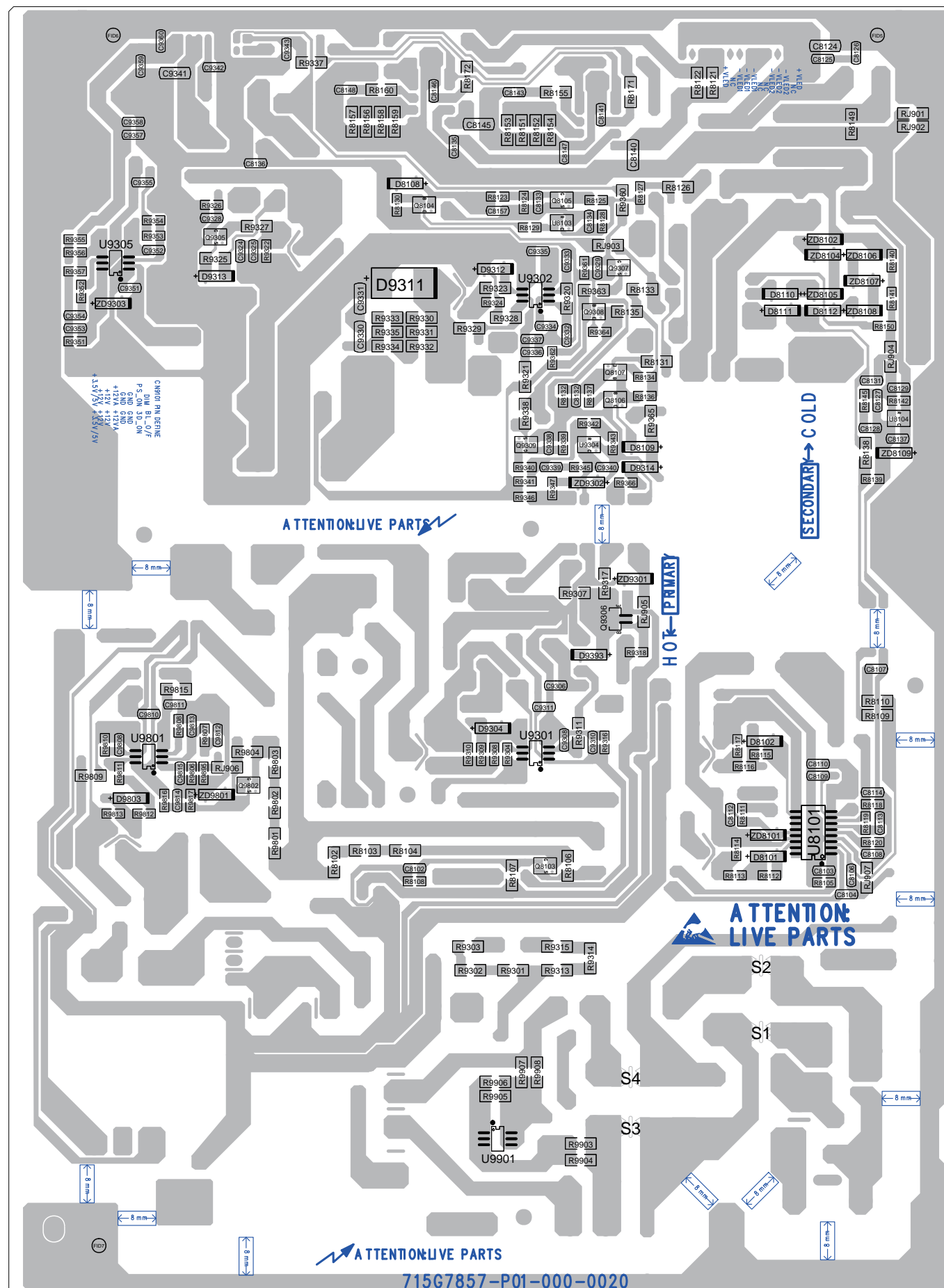


LAYOUT TOP

715G7857

2015.11.18

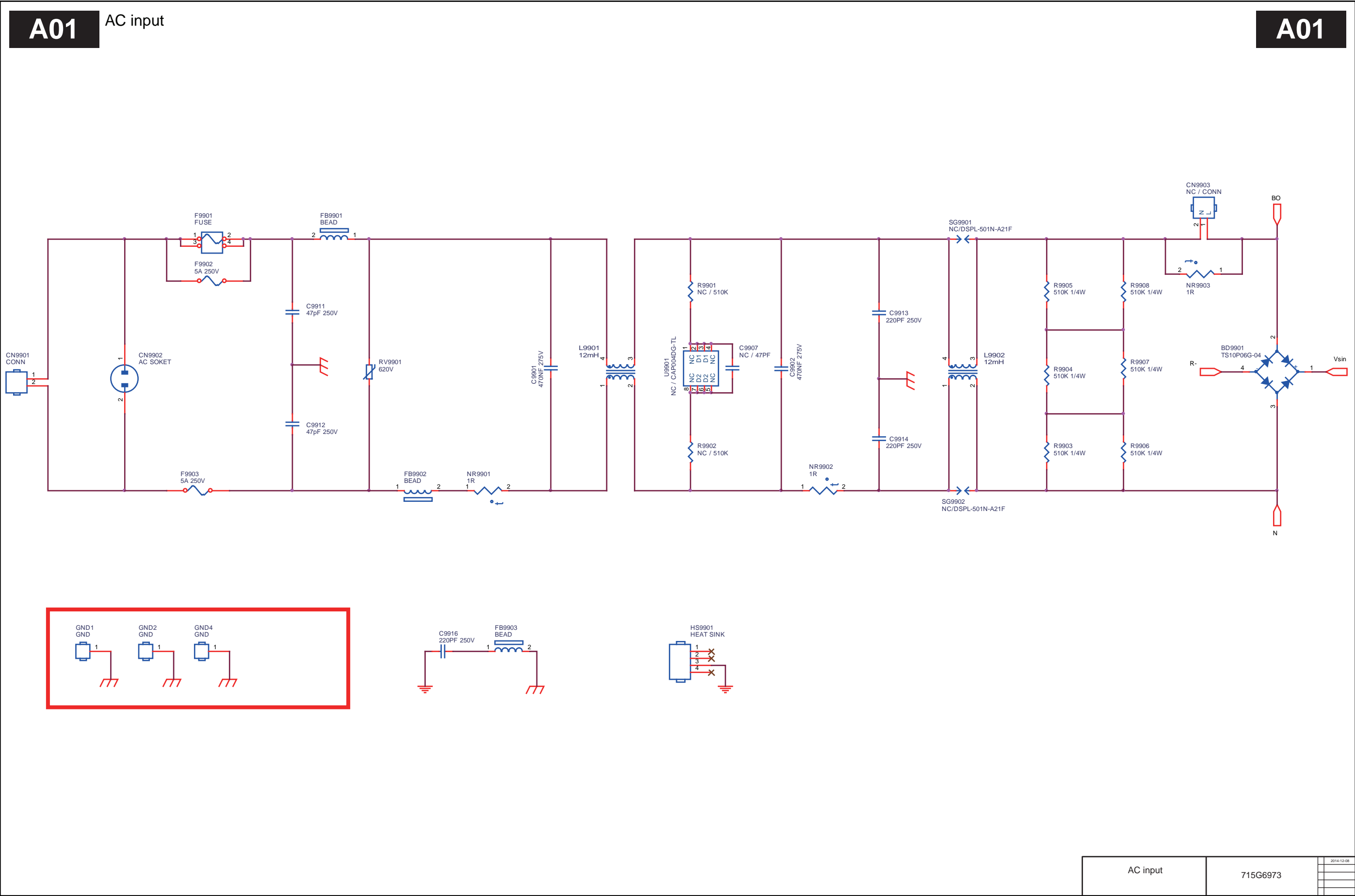
10-1-6 Power layout bottom



LAYOUT BOTTOM	715G7857	2015-11-18

10.2 A 715G6973 PSU

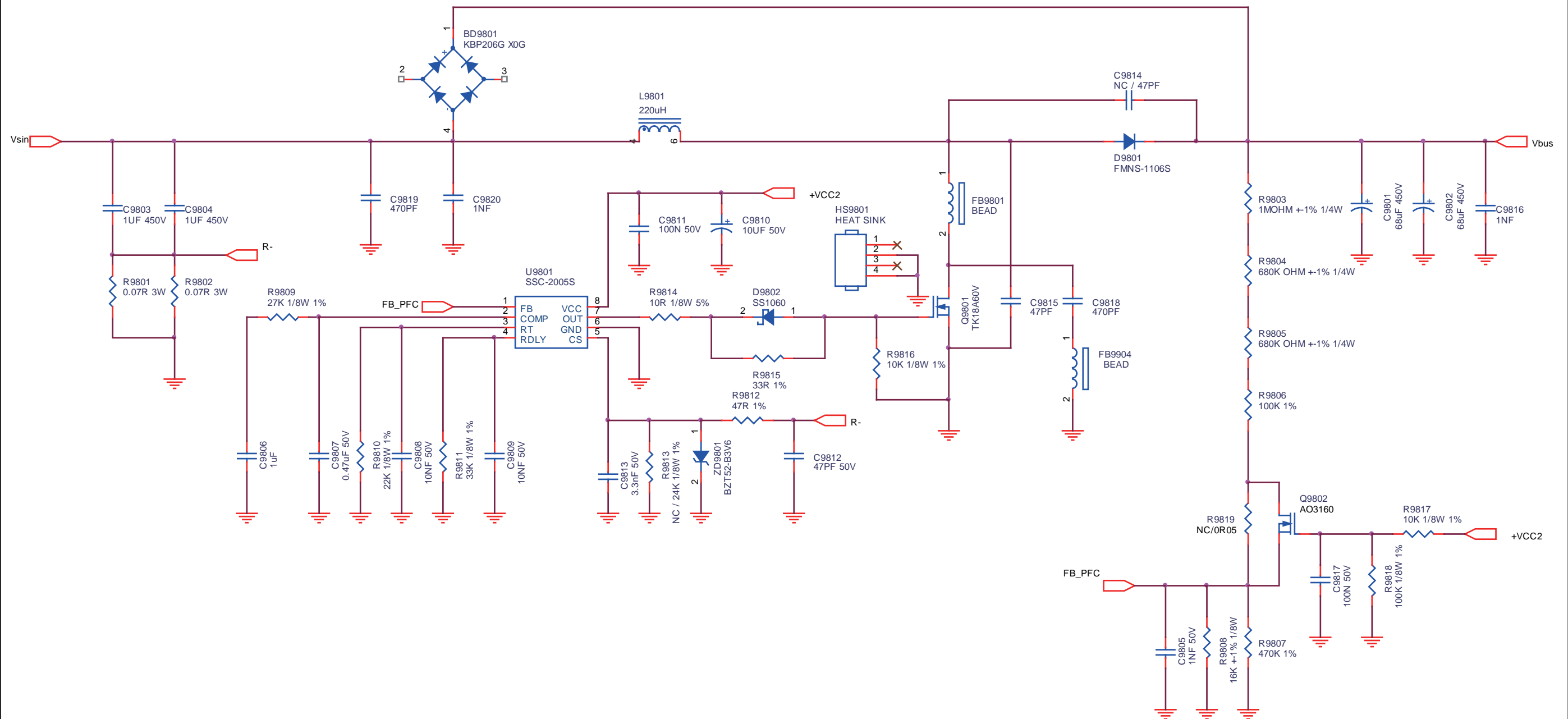
10-2-1 AC input



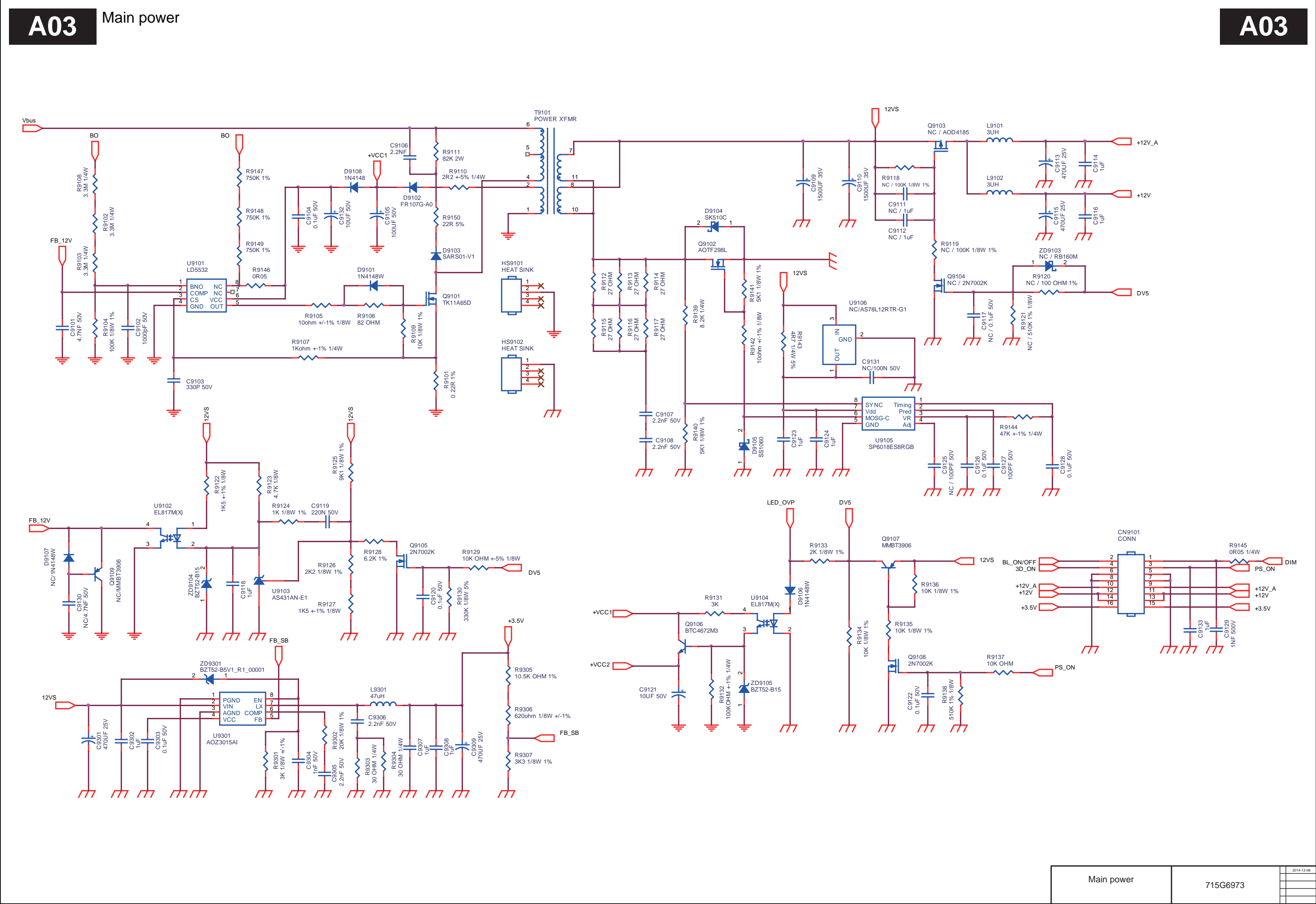
PFC

PFC

A02



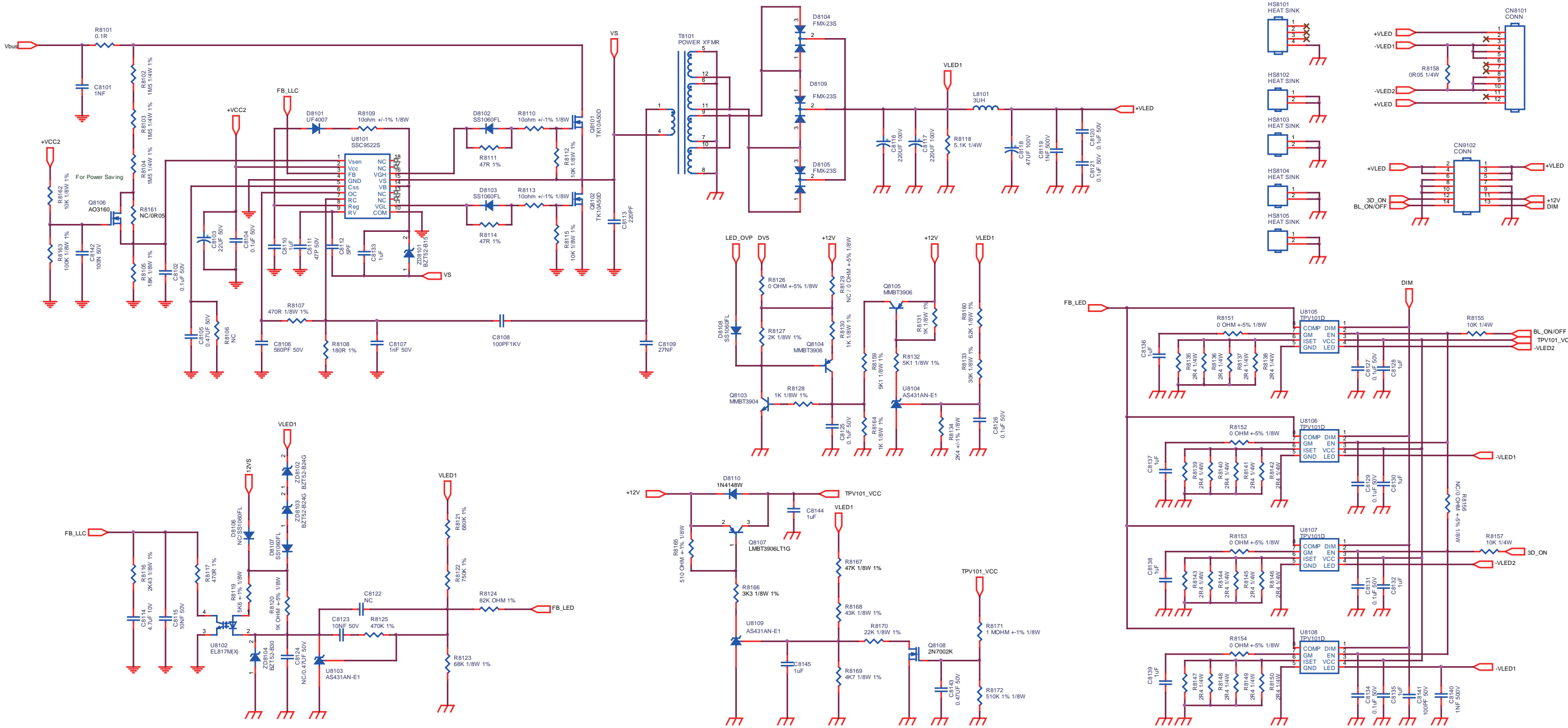
PFC	715G6973	2014-12-08



A04

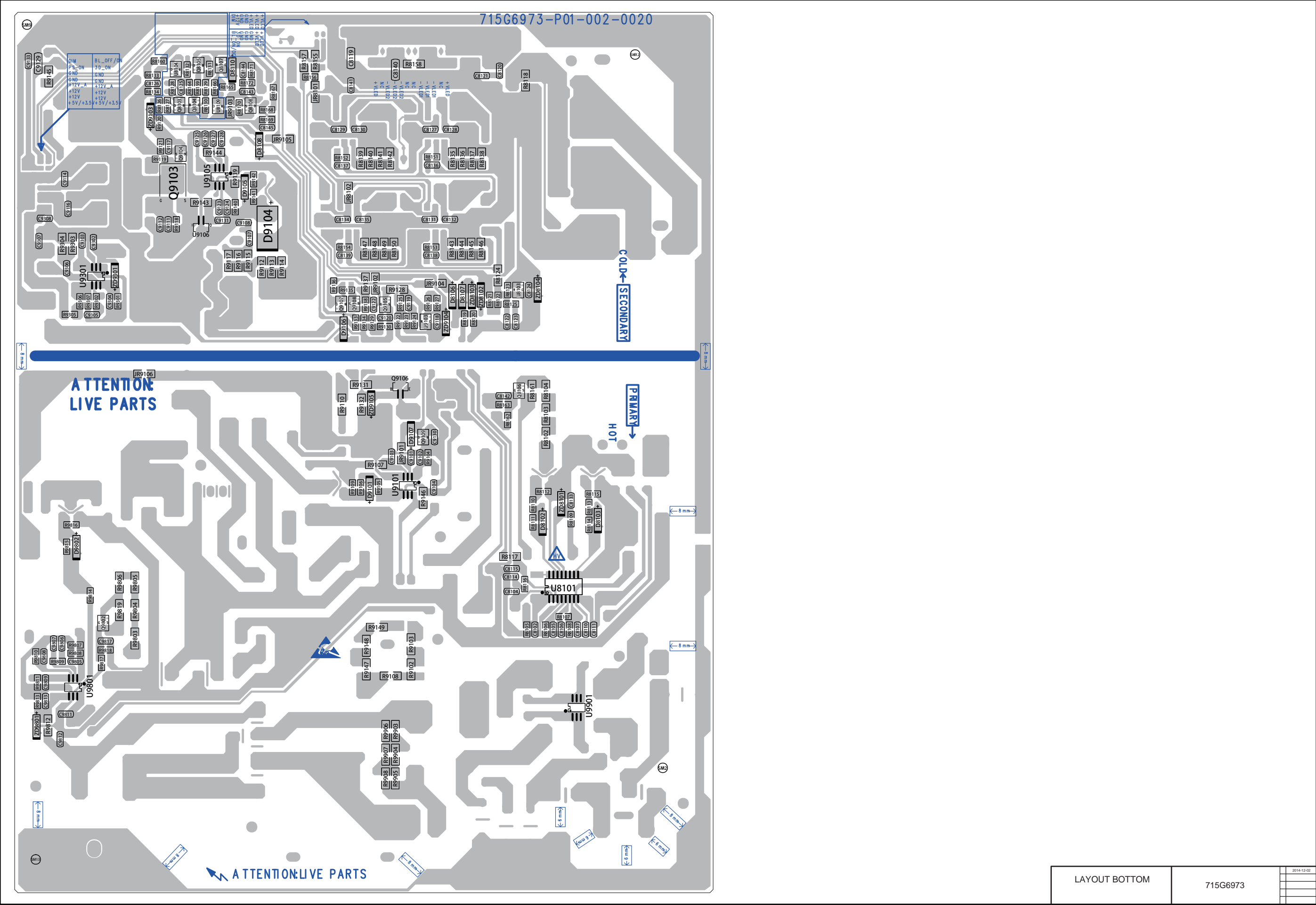
LED Driver

A04



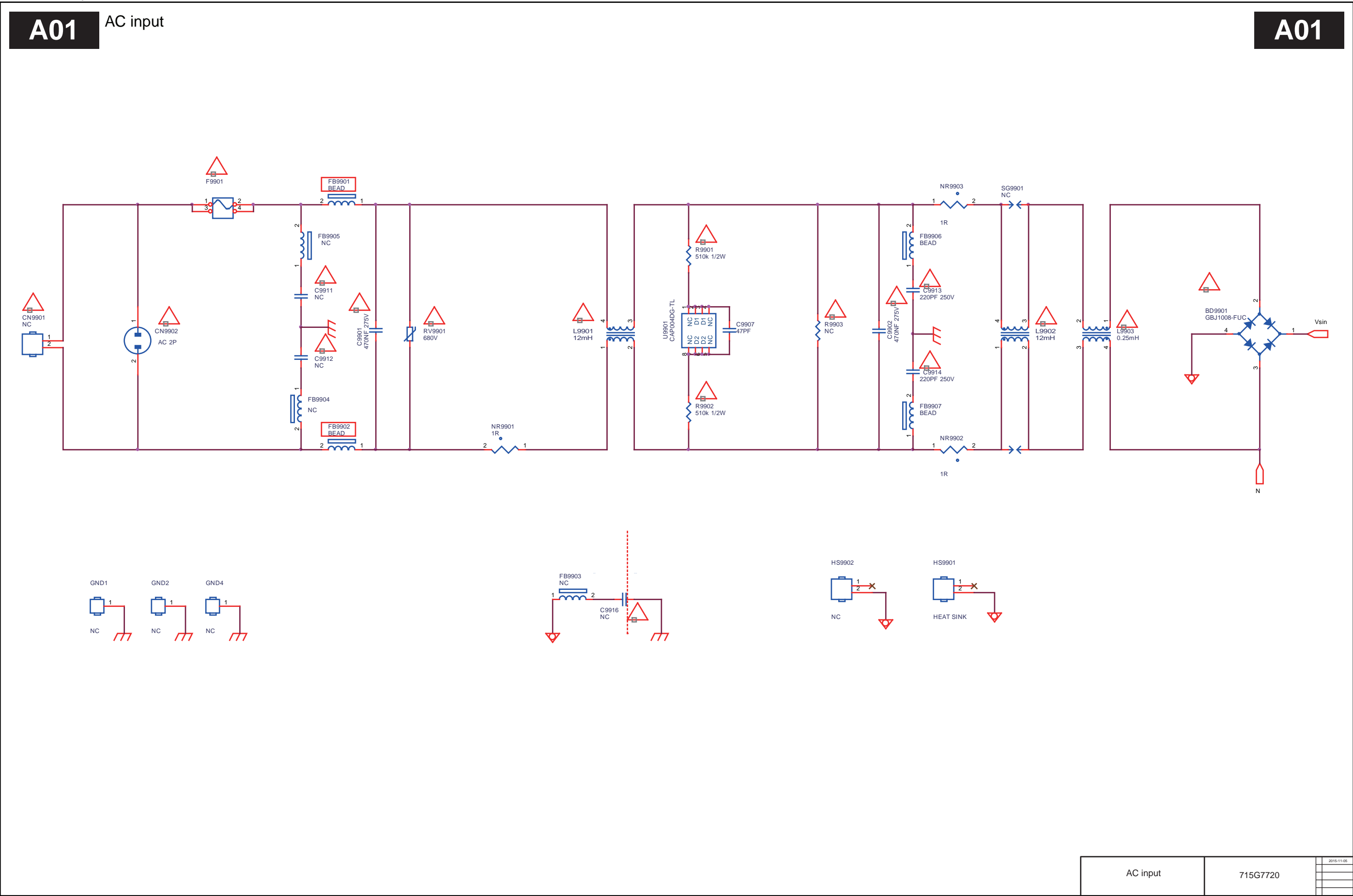
LED Driver	715G6973	2014-12-08

10-2-6 Power layout bottom



LAYOUT BOTTOM	715G6973	2014.12.02

10.3 A 715G7720 PSU
10-3-1 AC input

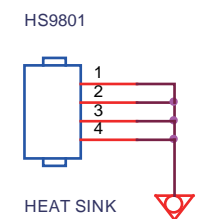
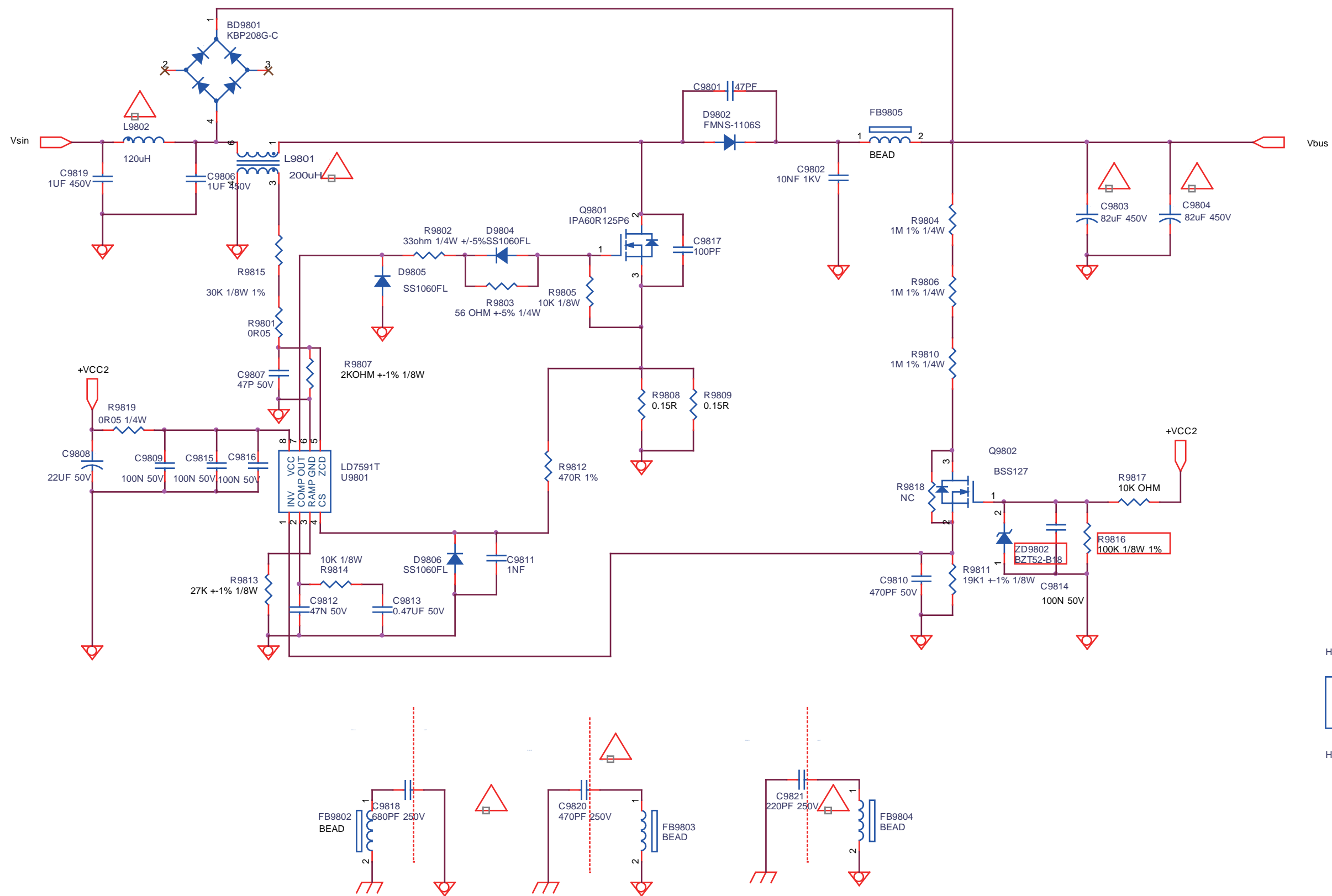


AC input	715G7720	2015-11-05

A02

PFC LD7591T

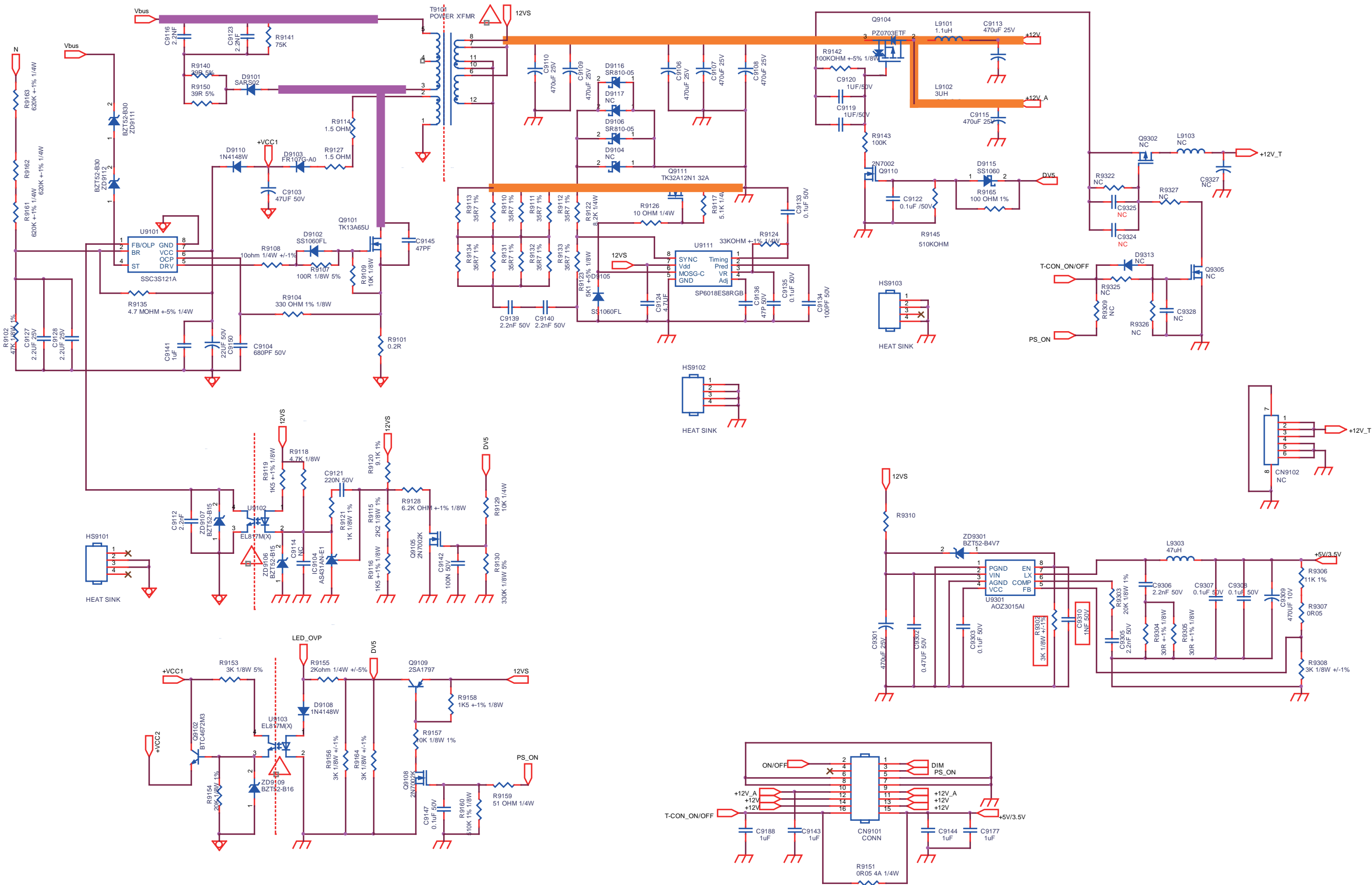
A02



A03

Main power SSC3S121A

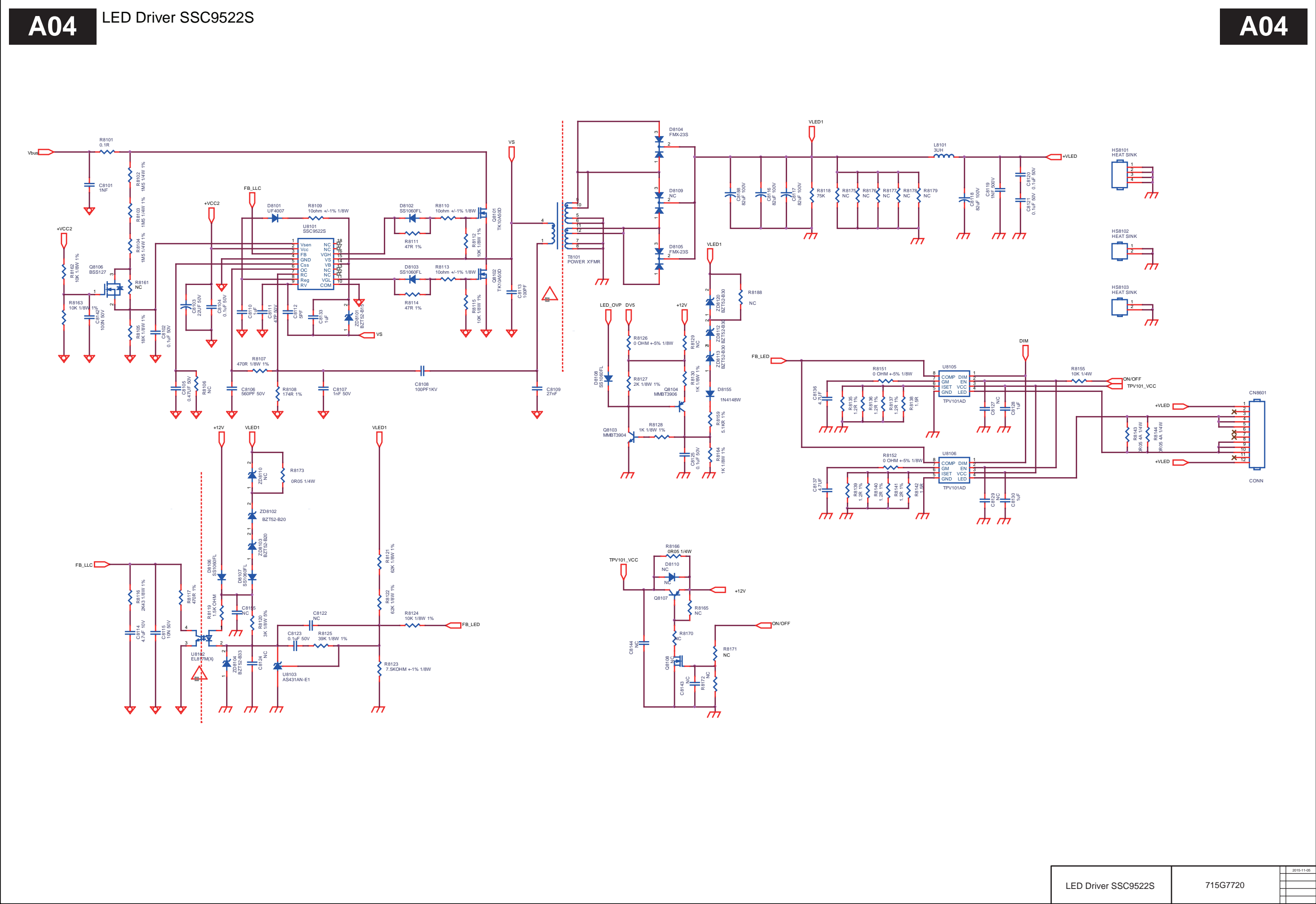
A03



Main power SSC3S121A

715G7720

2015-11-05

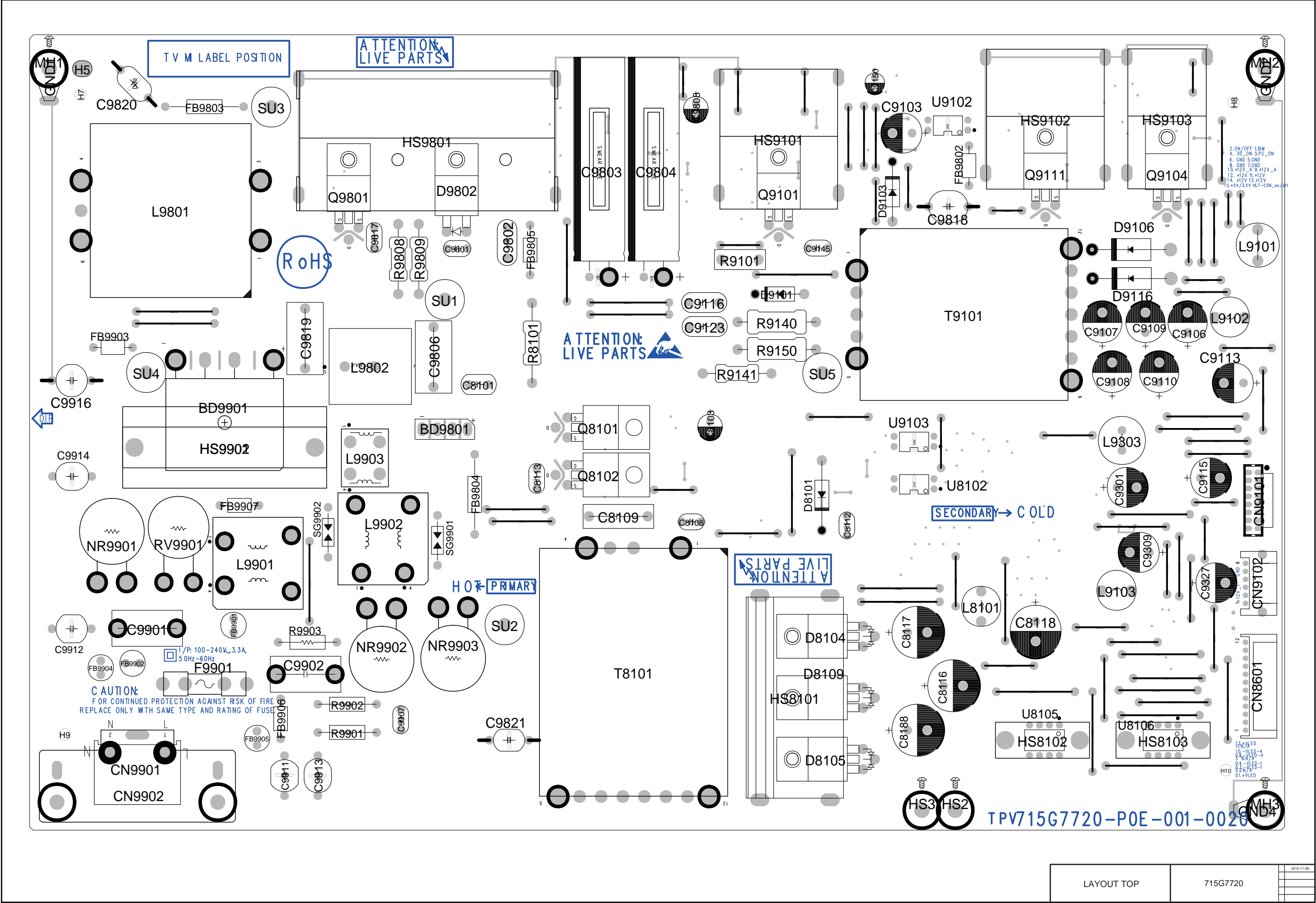


LED Driver SSC9522S

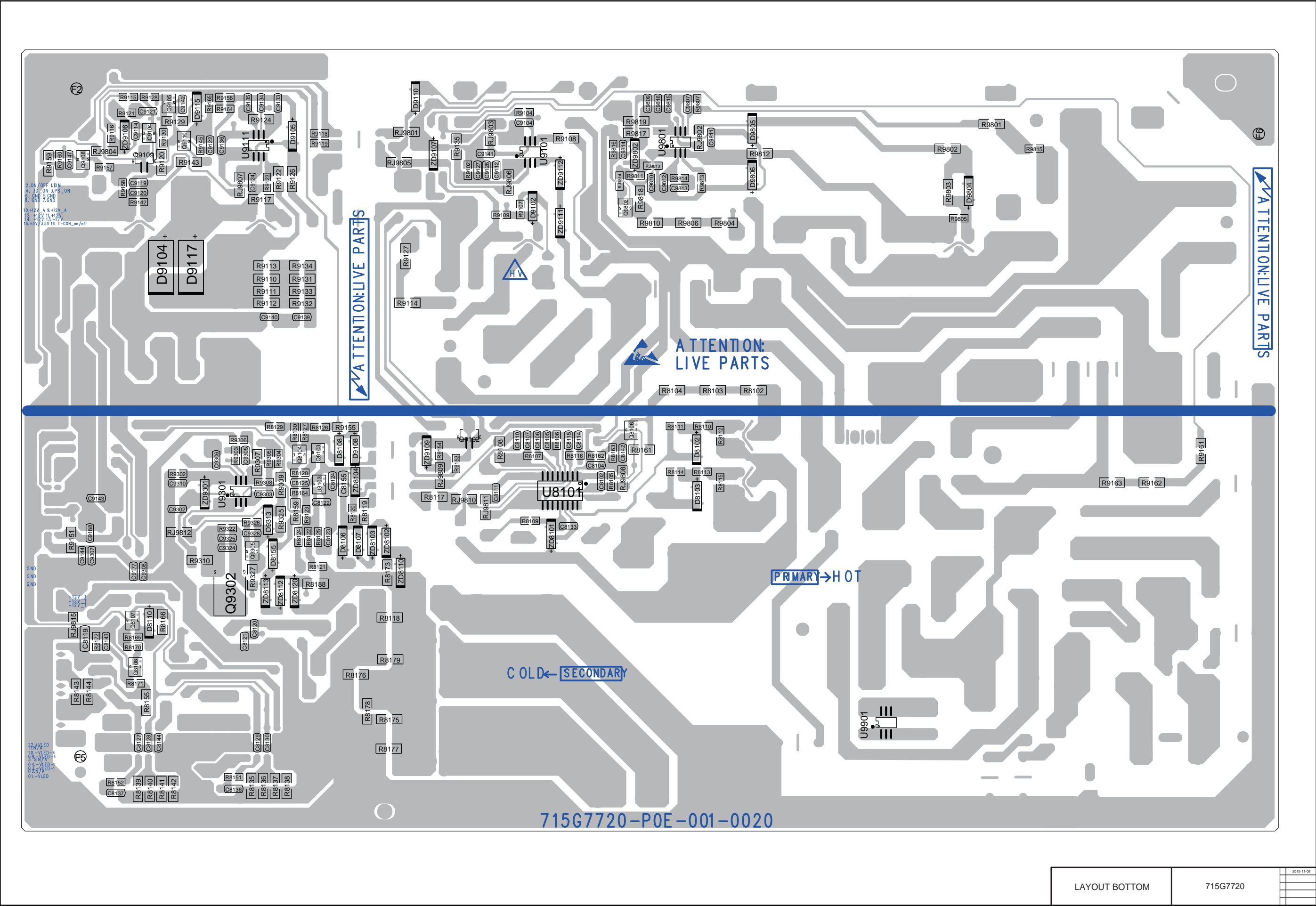
715G7720

2015-11-05

10-3-5 Power layout top

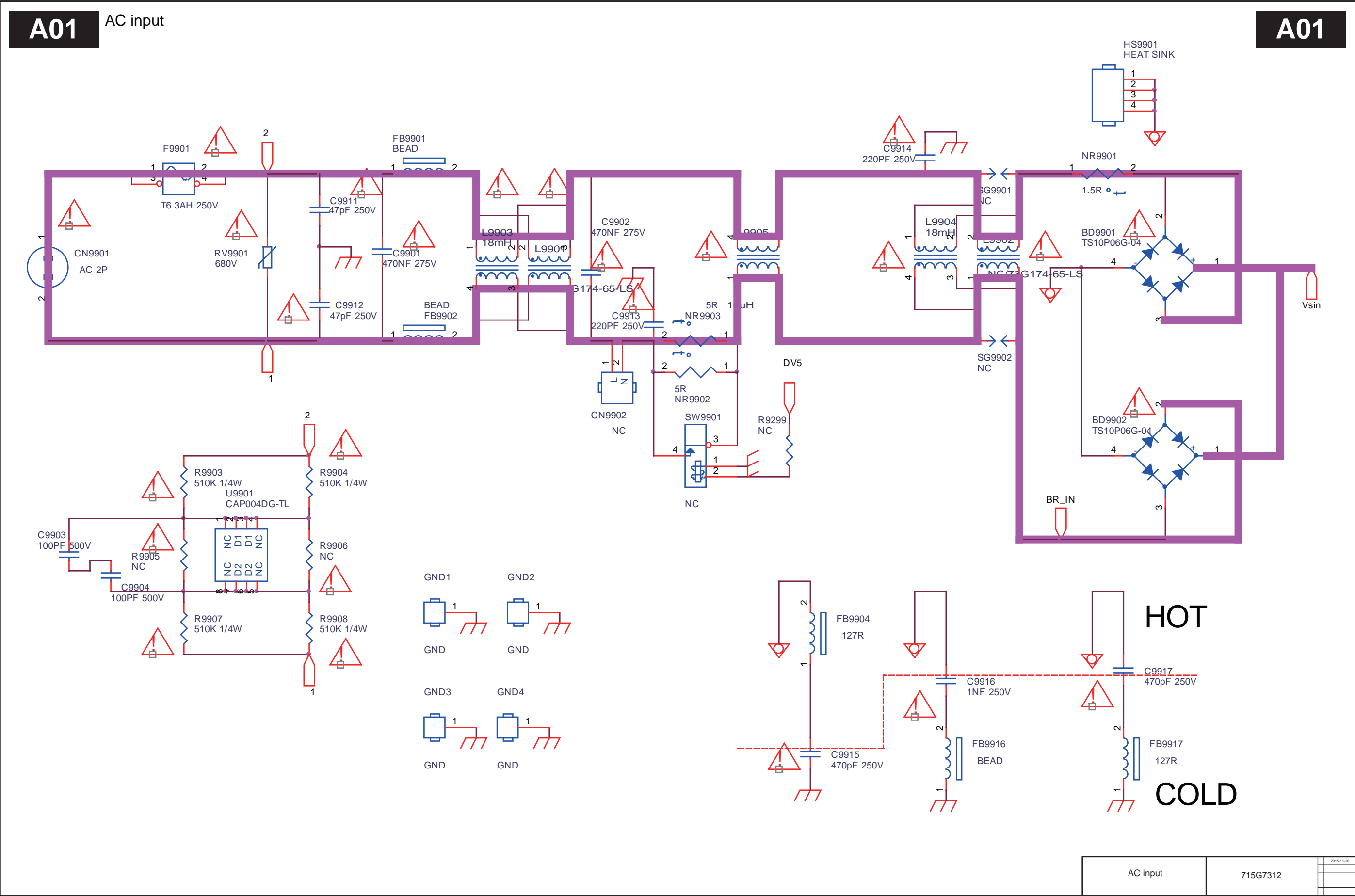


10-3-6 Power layout bottom



LAYOUT BOTTOM	715G7720	2015-11-08

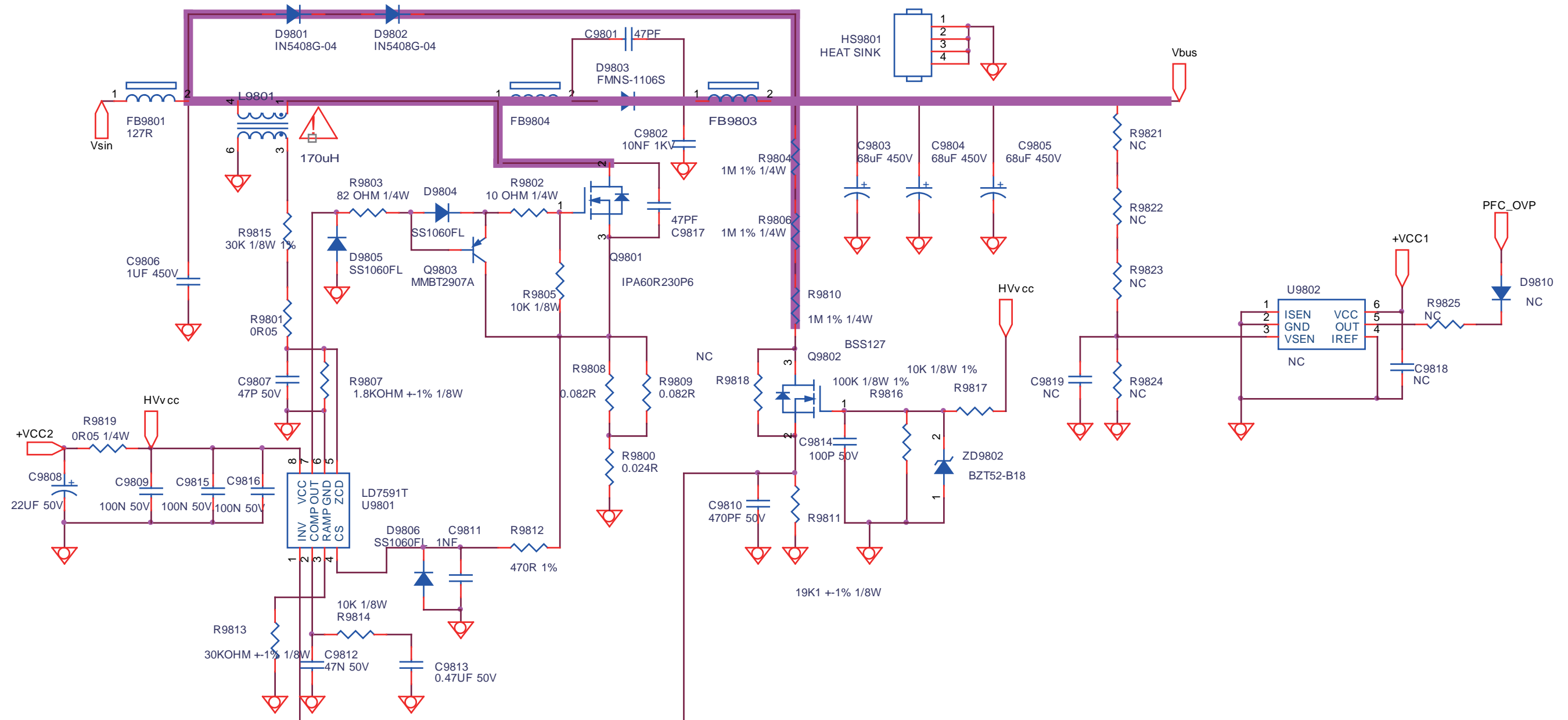
10.4 A 715G7312 PSU
10-4-1 AC input



A02

PFC with LD7591T

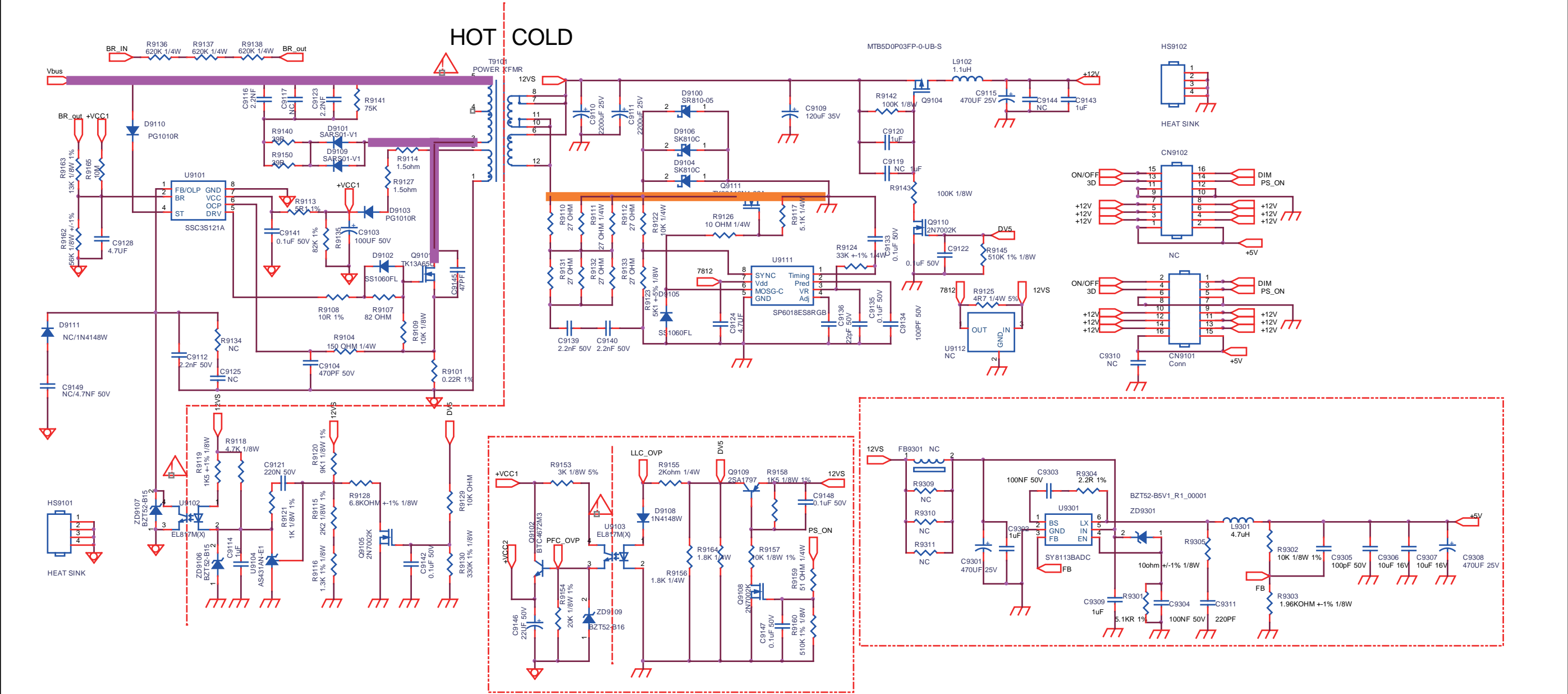
A02



A03

Flyback with SSC3S121

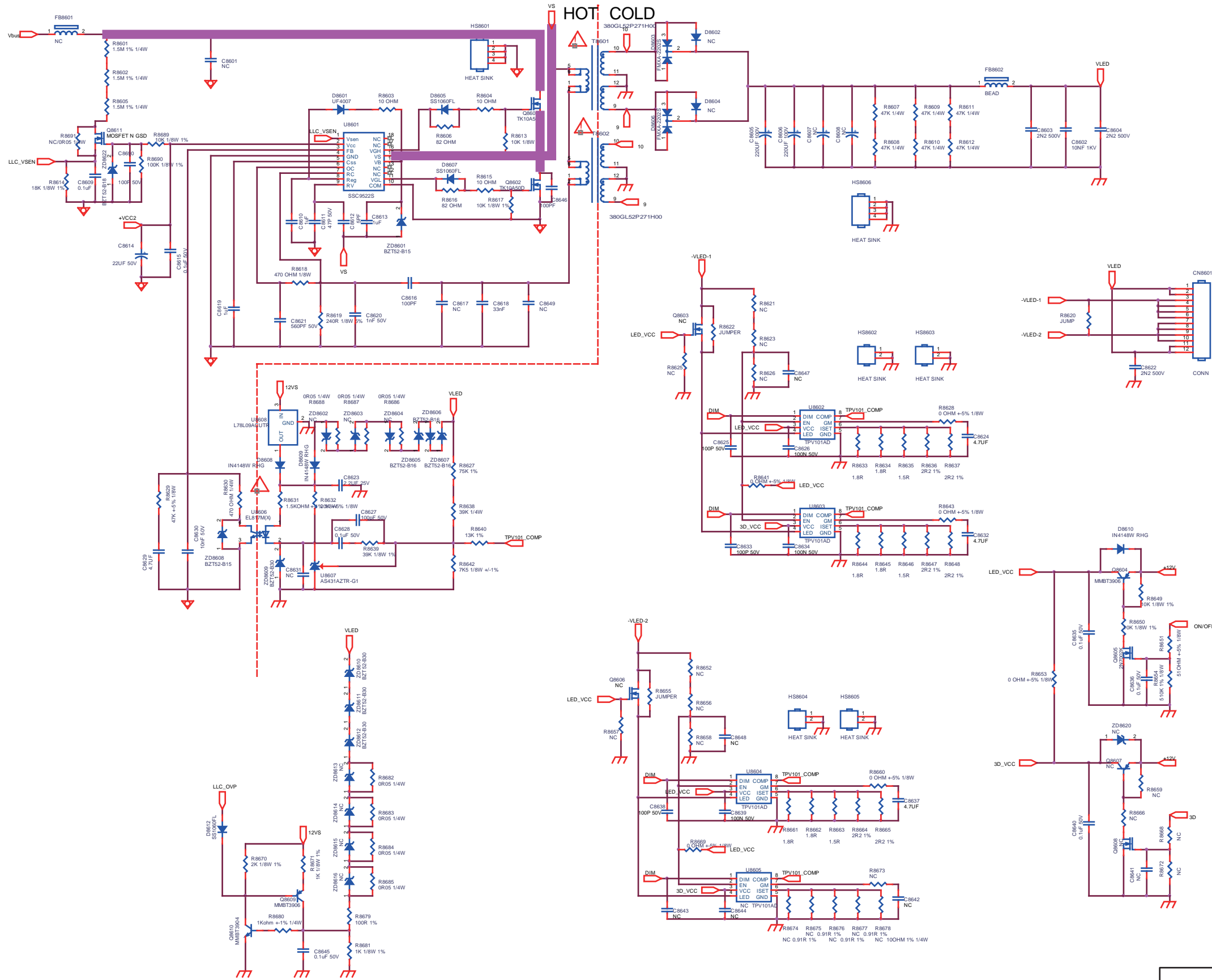
A03



A04

LLC with TPV101

A04

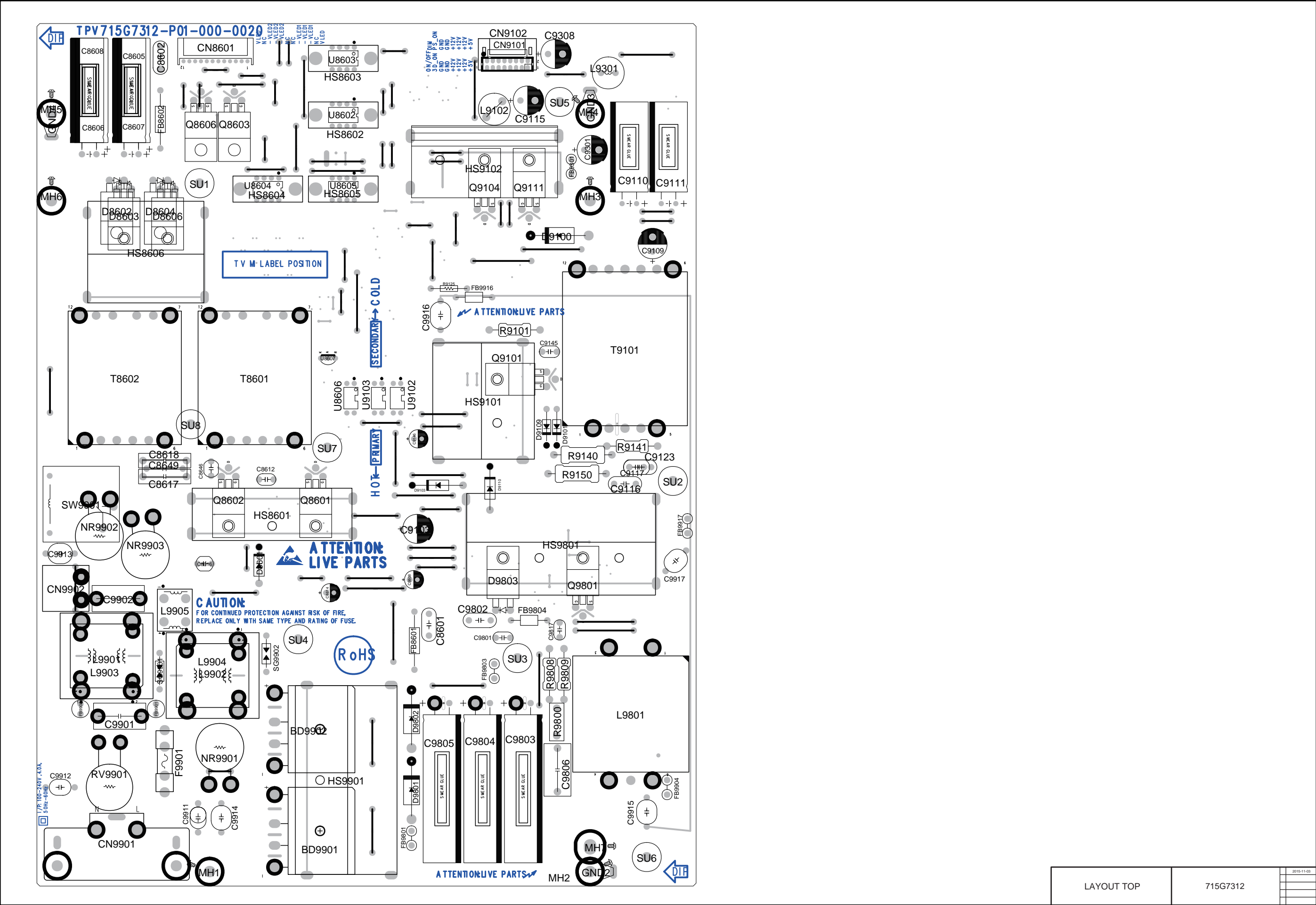


LLC with TPV101

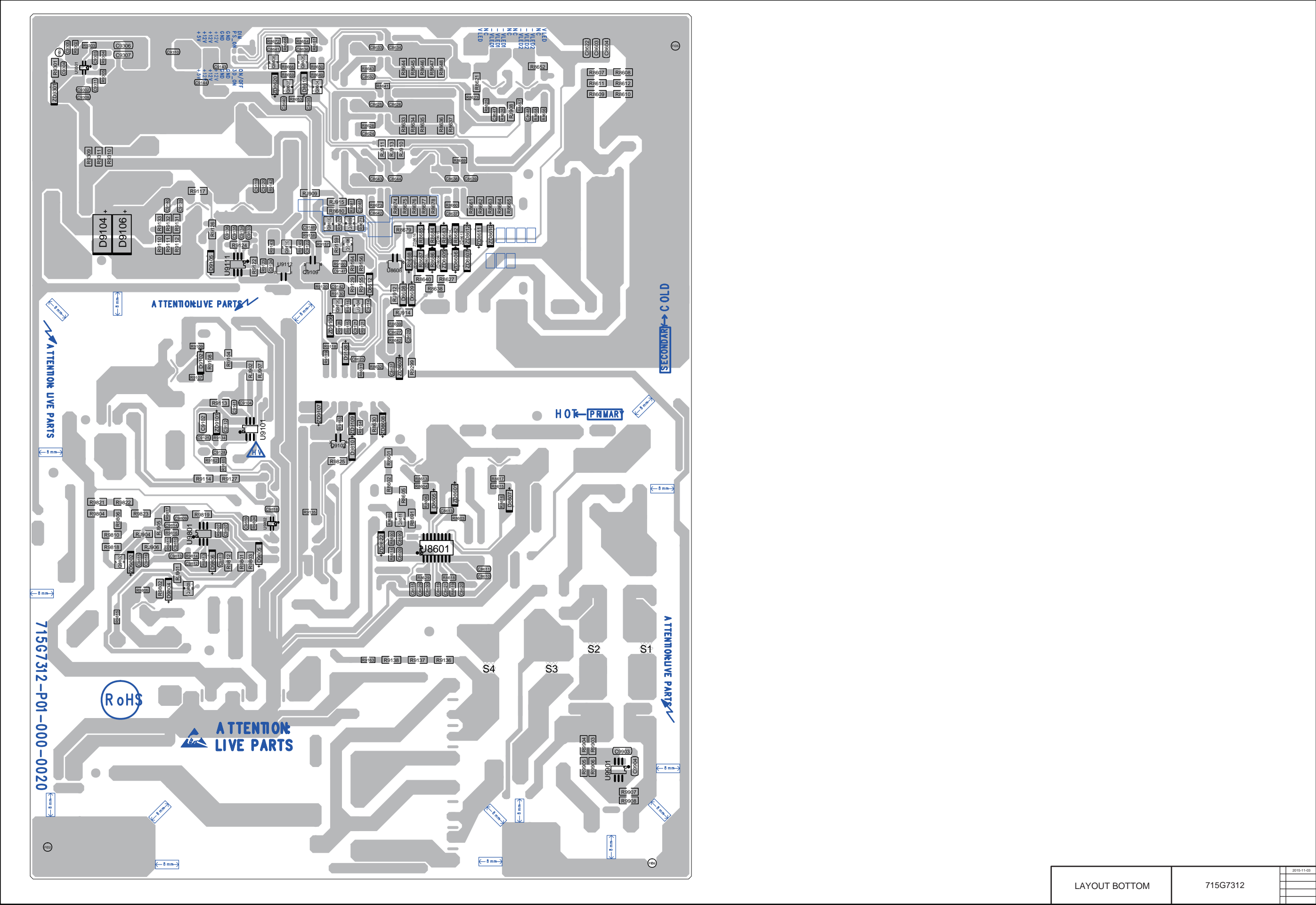
715G7312

2015-11-25

10-4-5 Power layout top

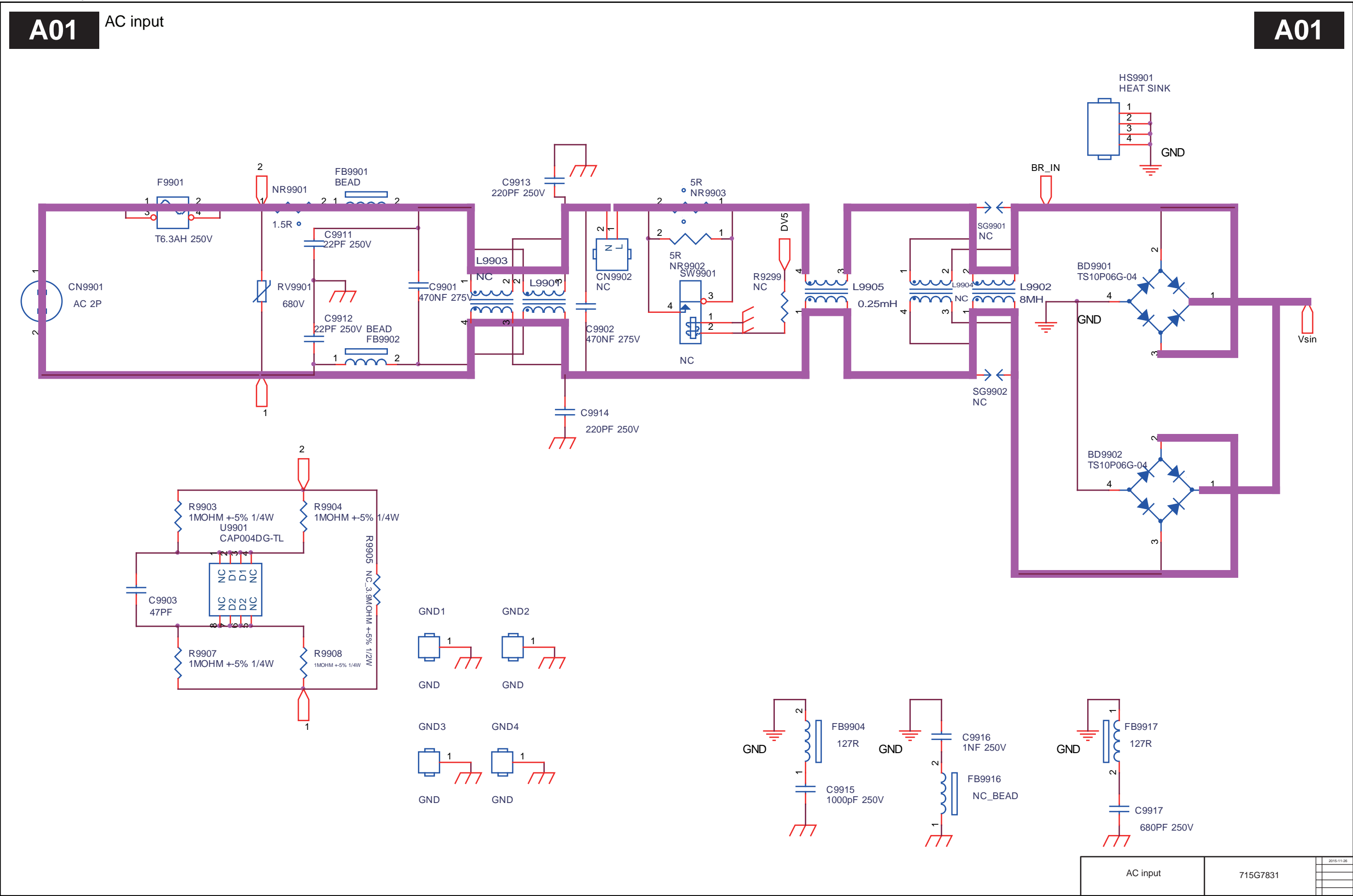


10-4-6 Power layout bottom



LAYOUT BOTTOM	715G7312	2015-11-03

10.5 A 715G7831 PSU
10-5-1 AC input

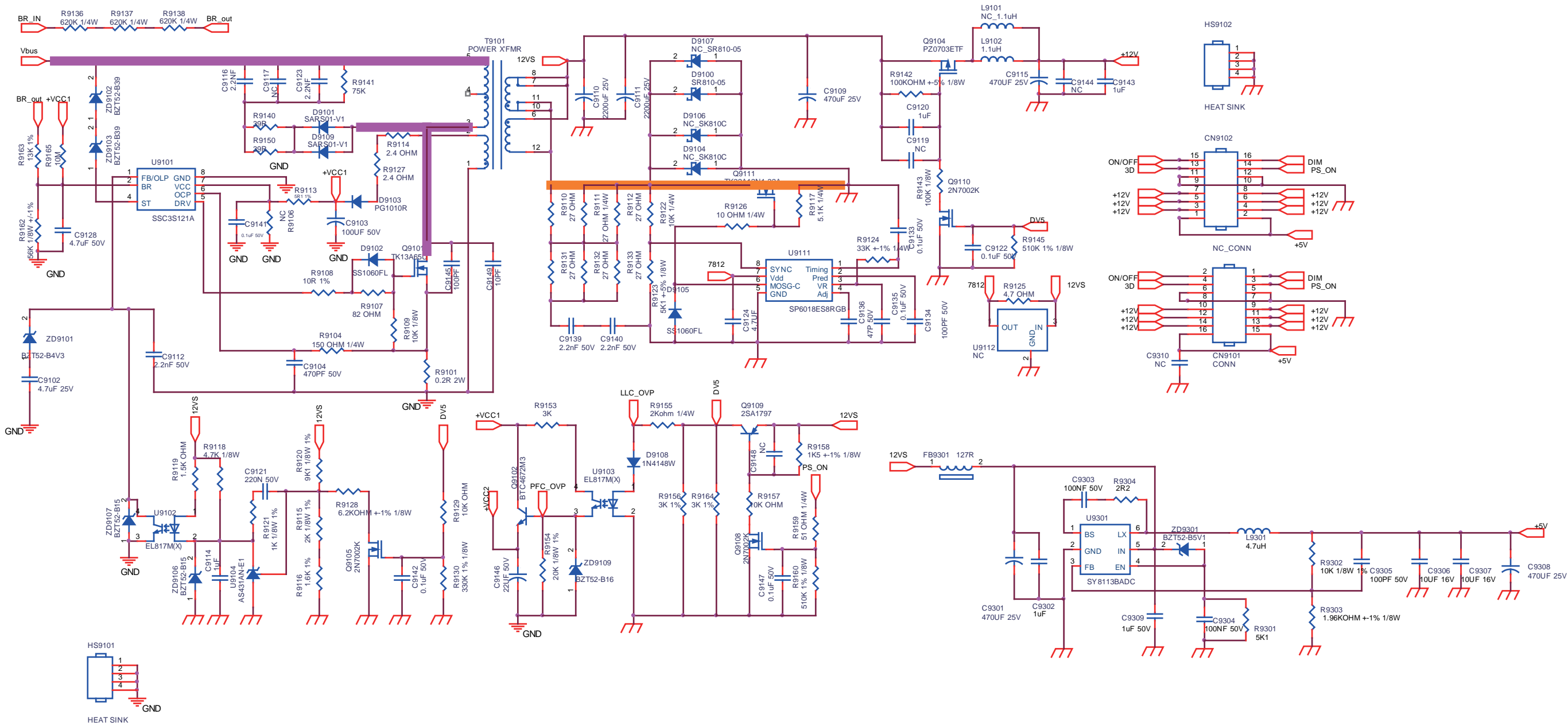


AC input	715G7831	2015-11-26

A03

Flyback with SSC3S121

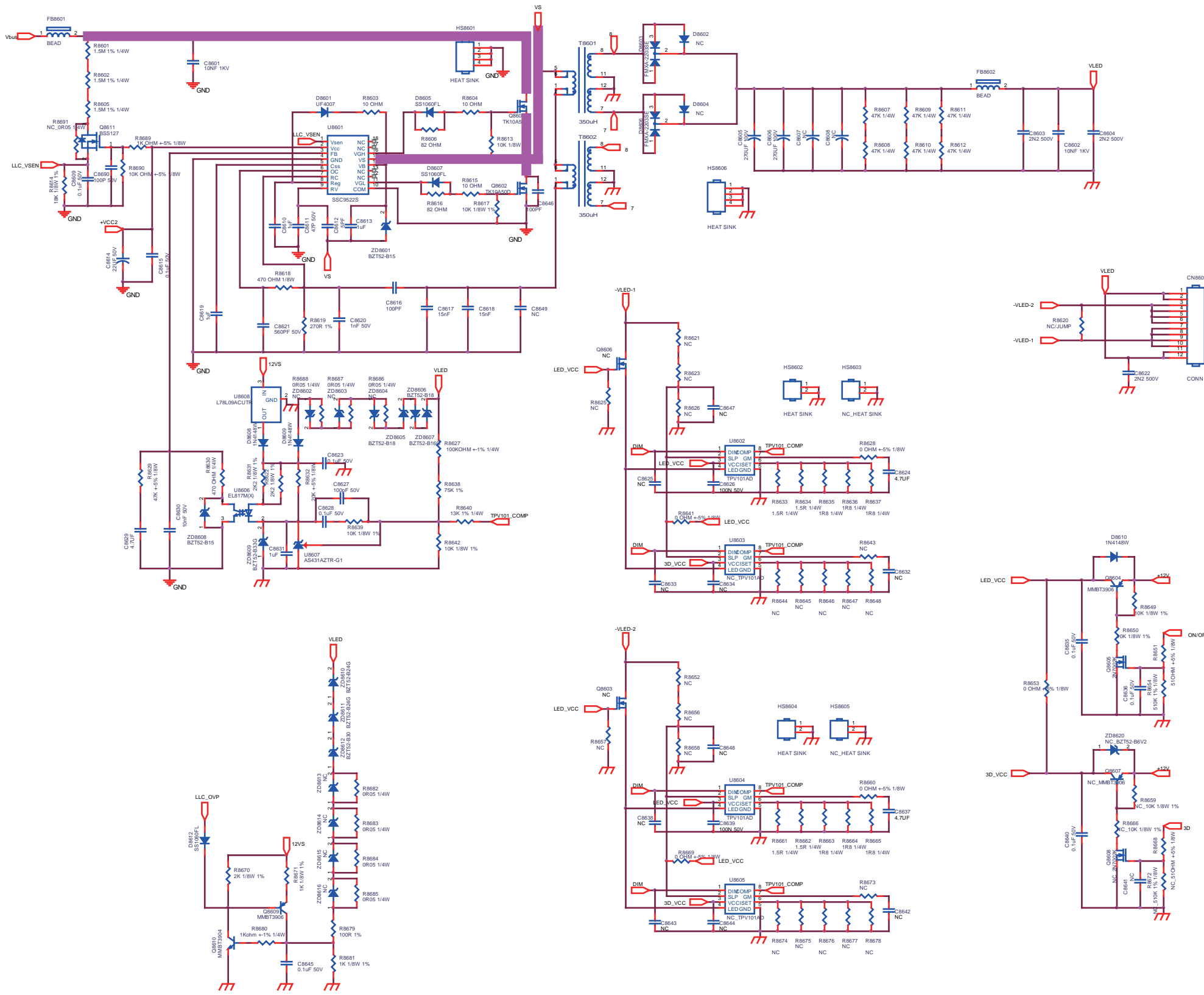
A03



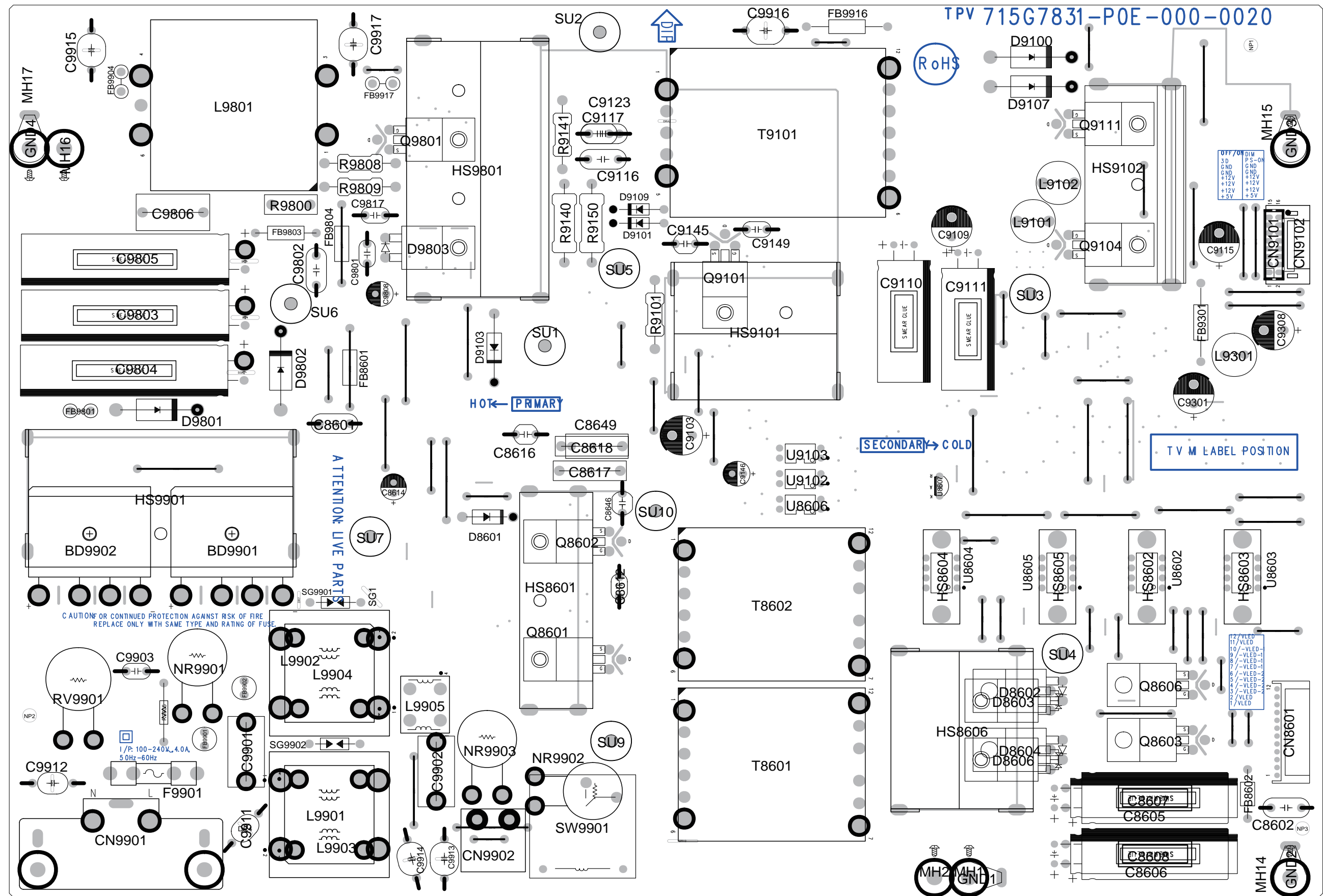
A04

LLC with TPV101

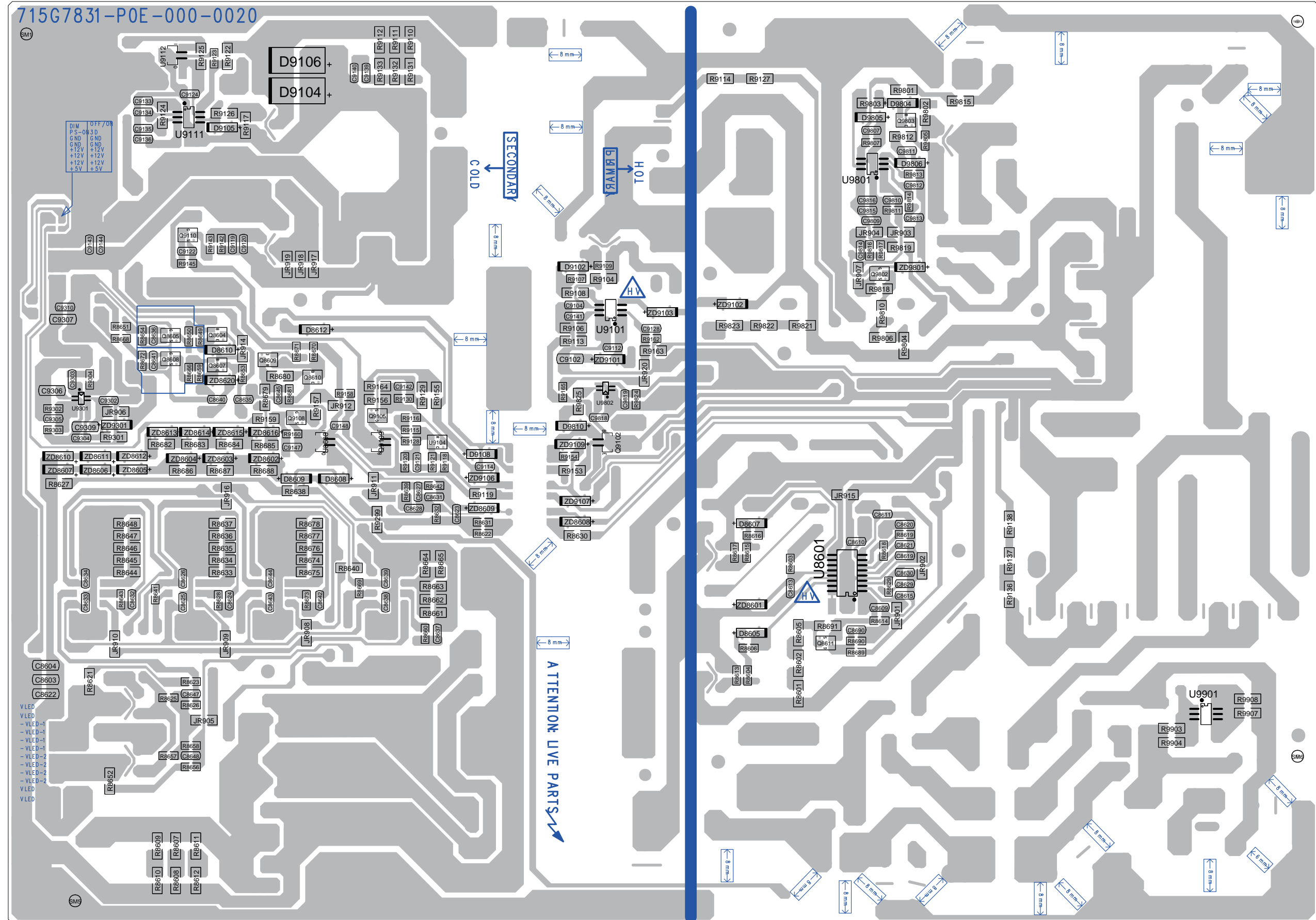
A04



10-5-5 Power layout top



10-5-6 Power layout bottom



LAYOUT BOTTOM

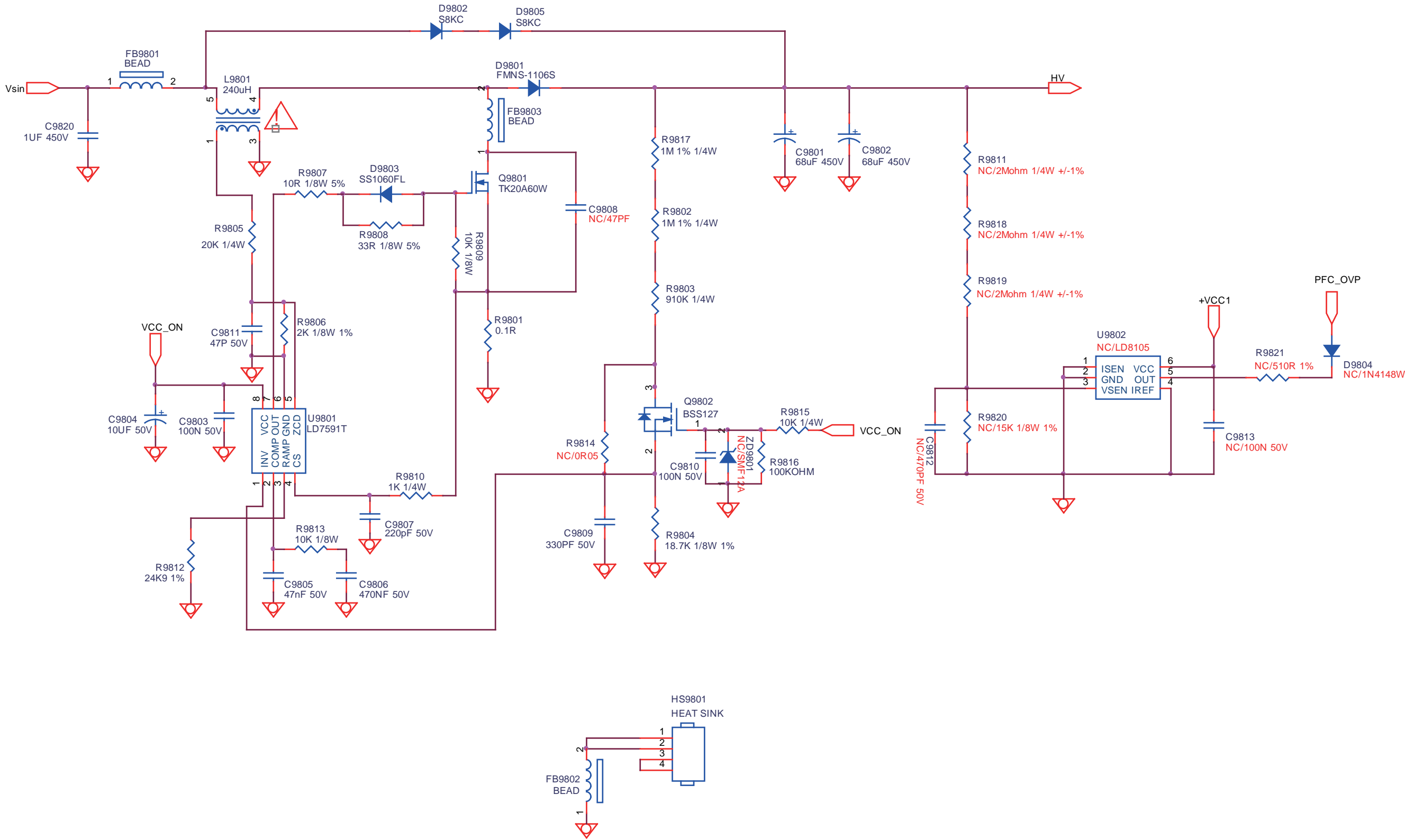
715G7831

2015-11-04

A02

PFC

A02



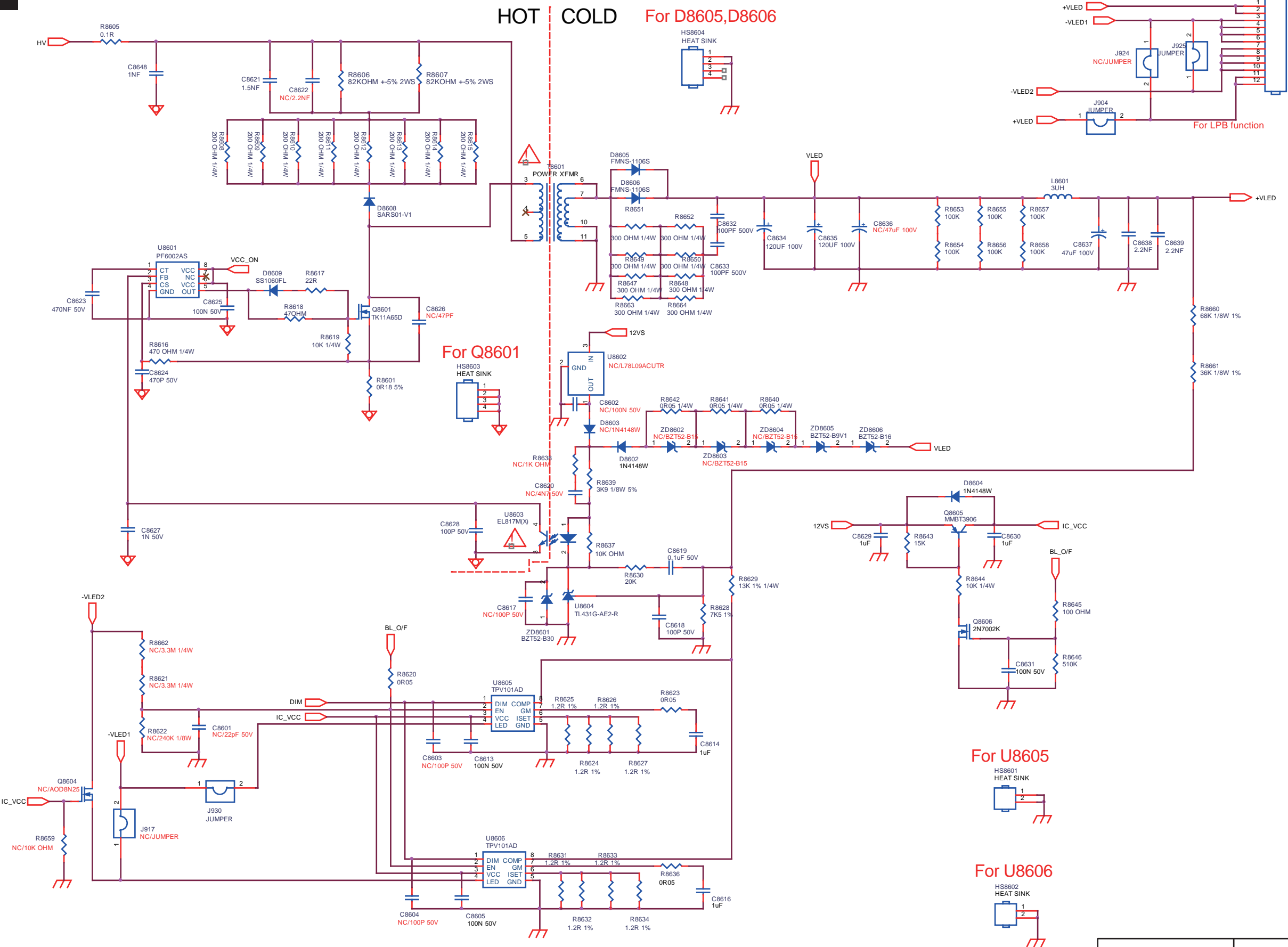
PFC	715G7350	2015-11-15

10-6-4 LED

A04

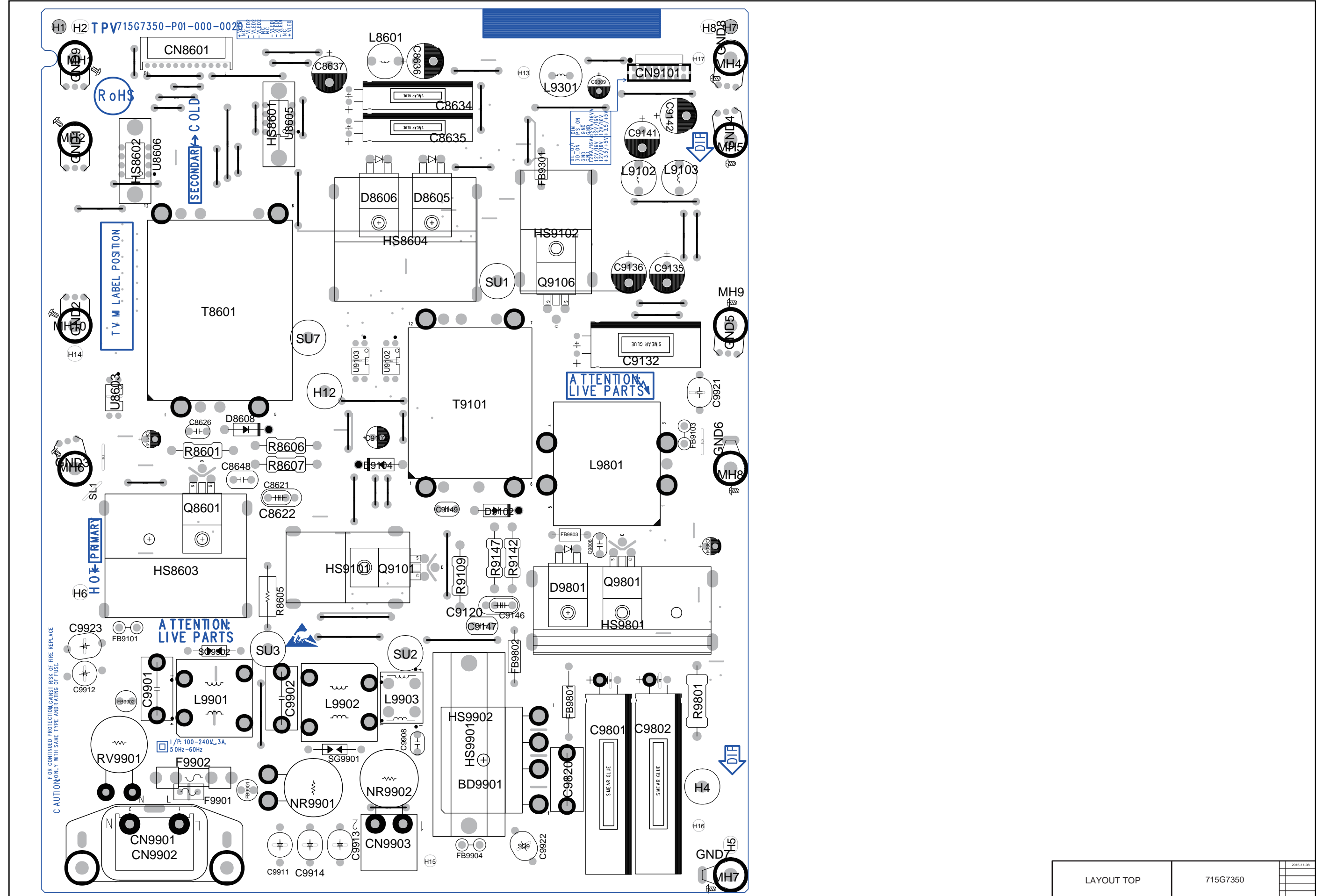
LED

A04

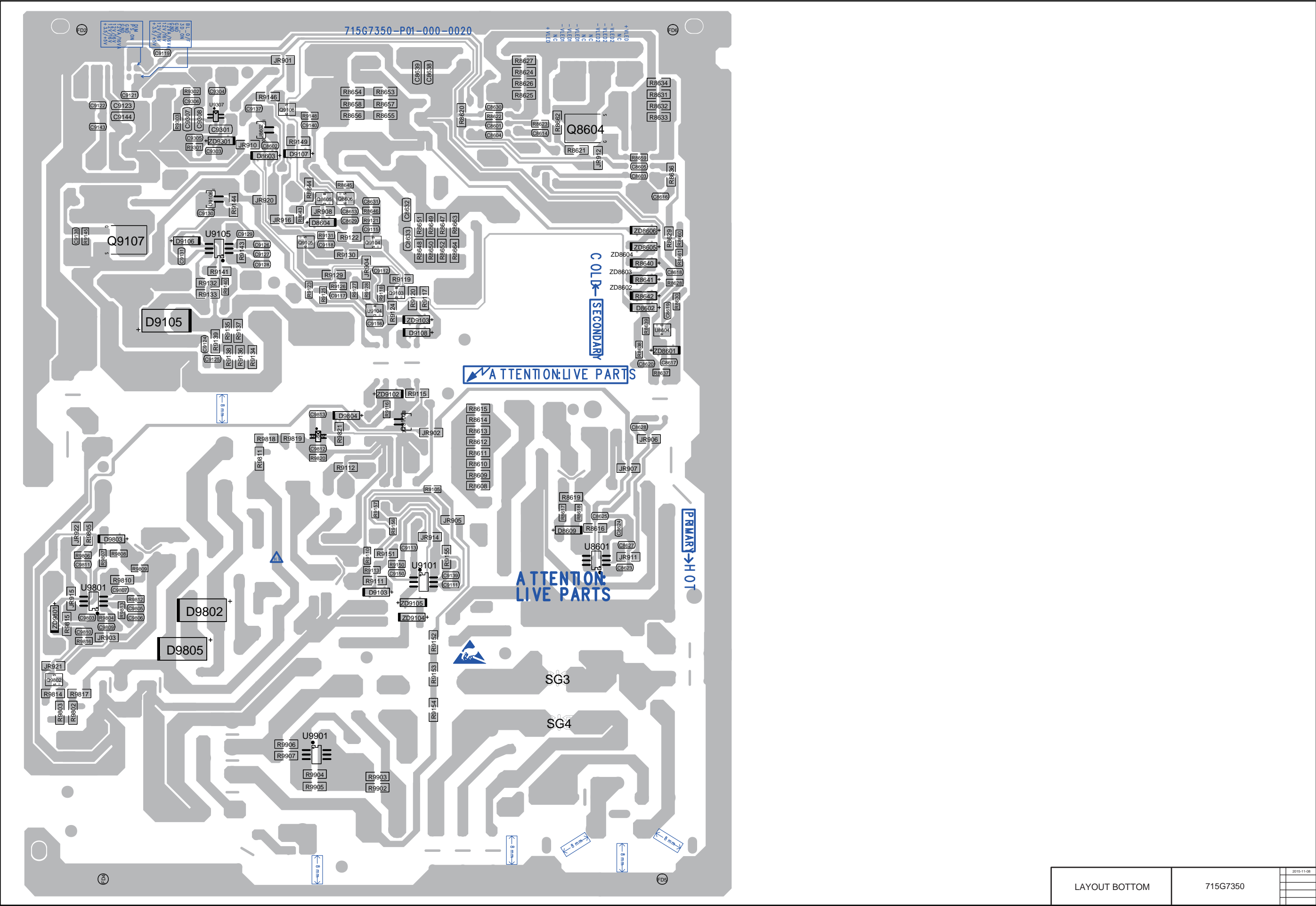


LED	715G7350

10-6-5 Power layout top

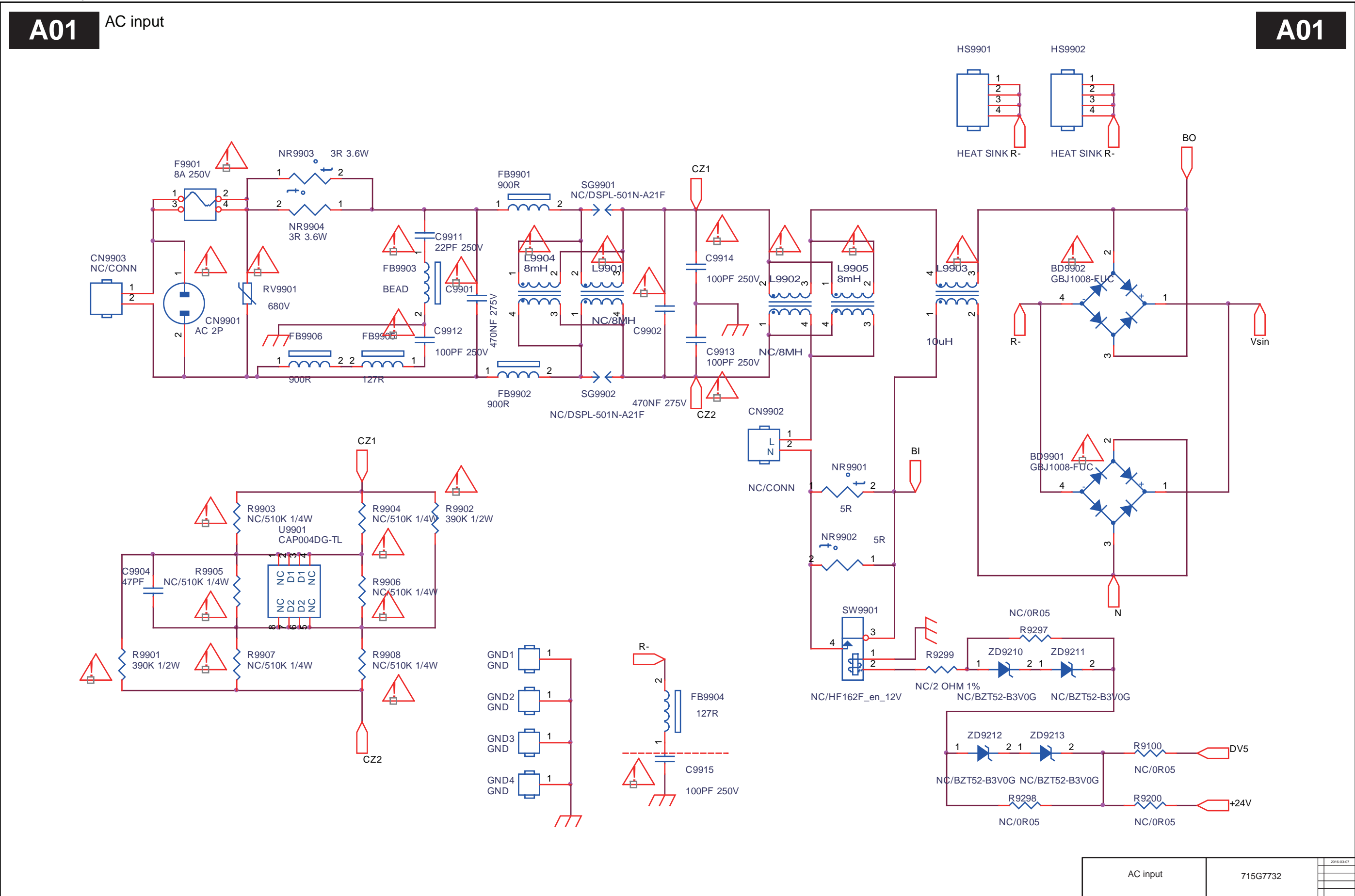


10-6-6 Power layout bottom



LAYOUT BOTTOM	715G7350	2015-11-08

10.7 A 715G7732 PSU
10-7-1 AC input



AC input

715G7732

2016-03-07

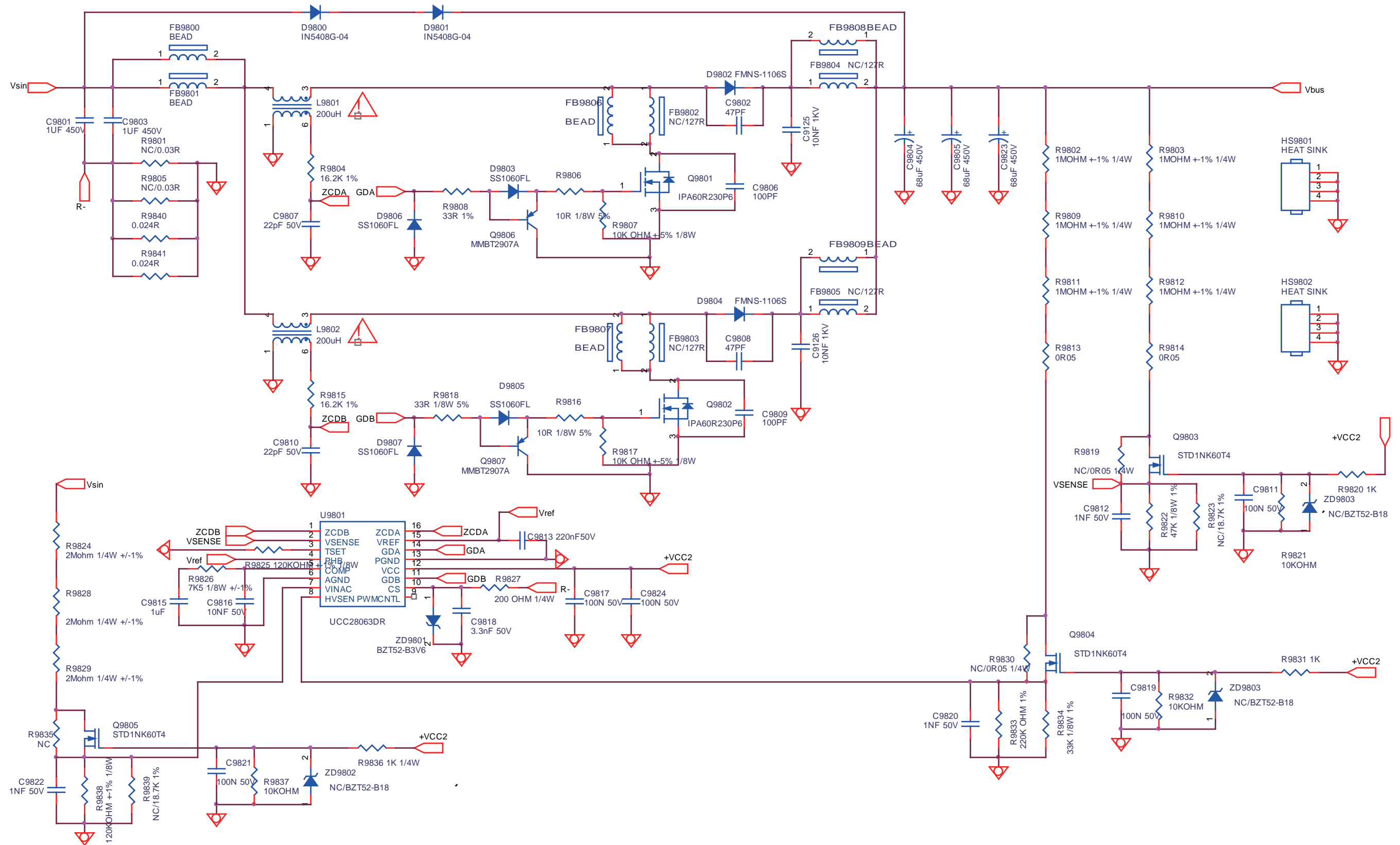
20150_501.eps

10-7-2 PFC with TI

A02

PFC with TI

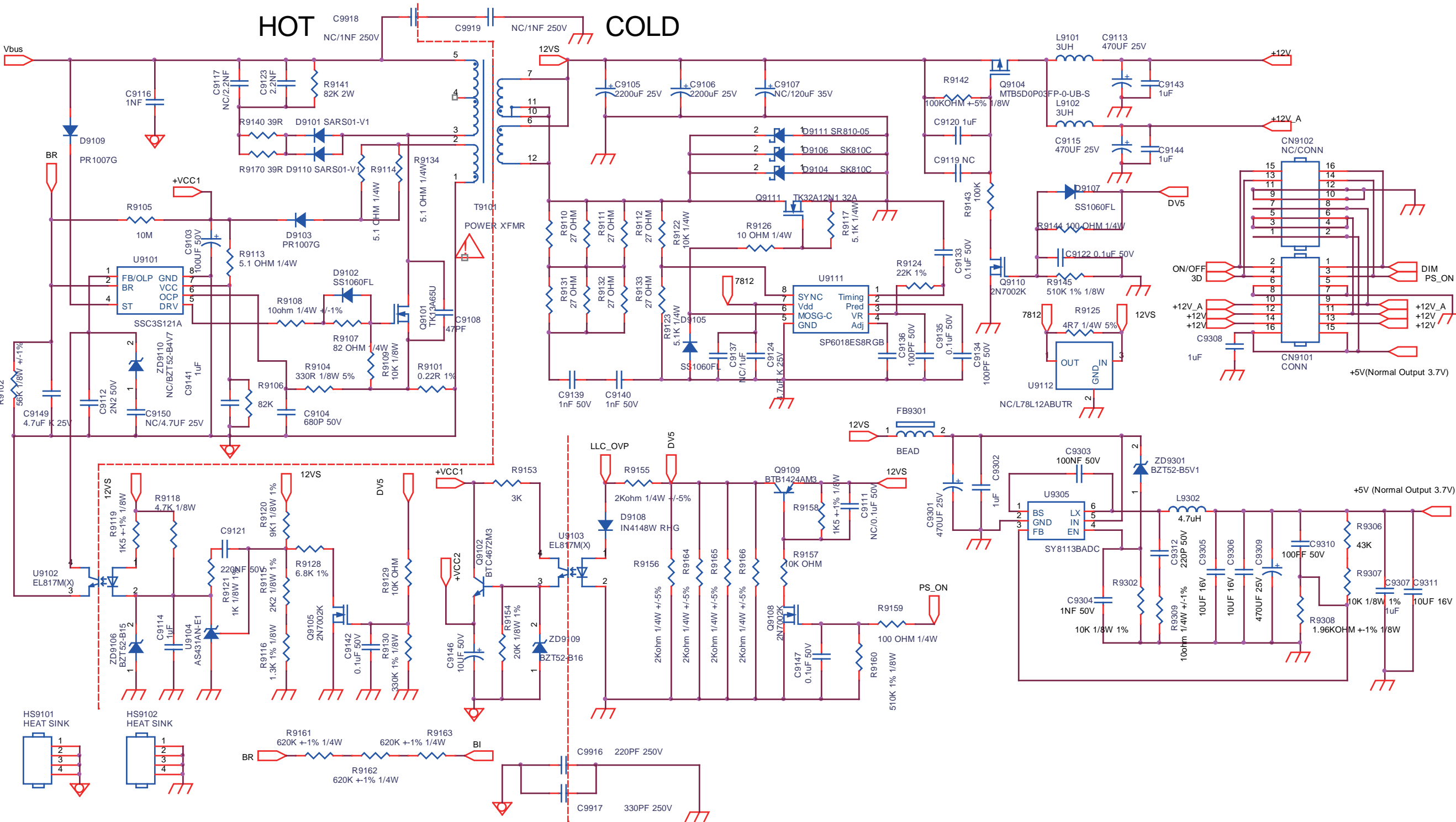
A02



A03

Flyback with Sanken QR

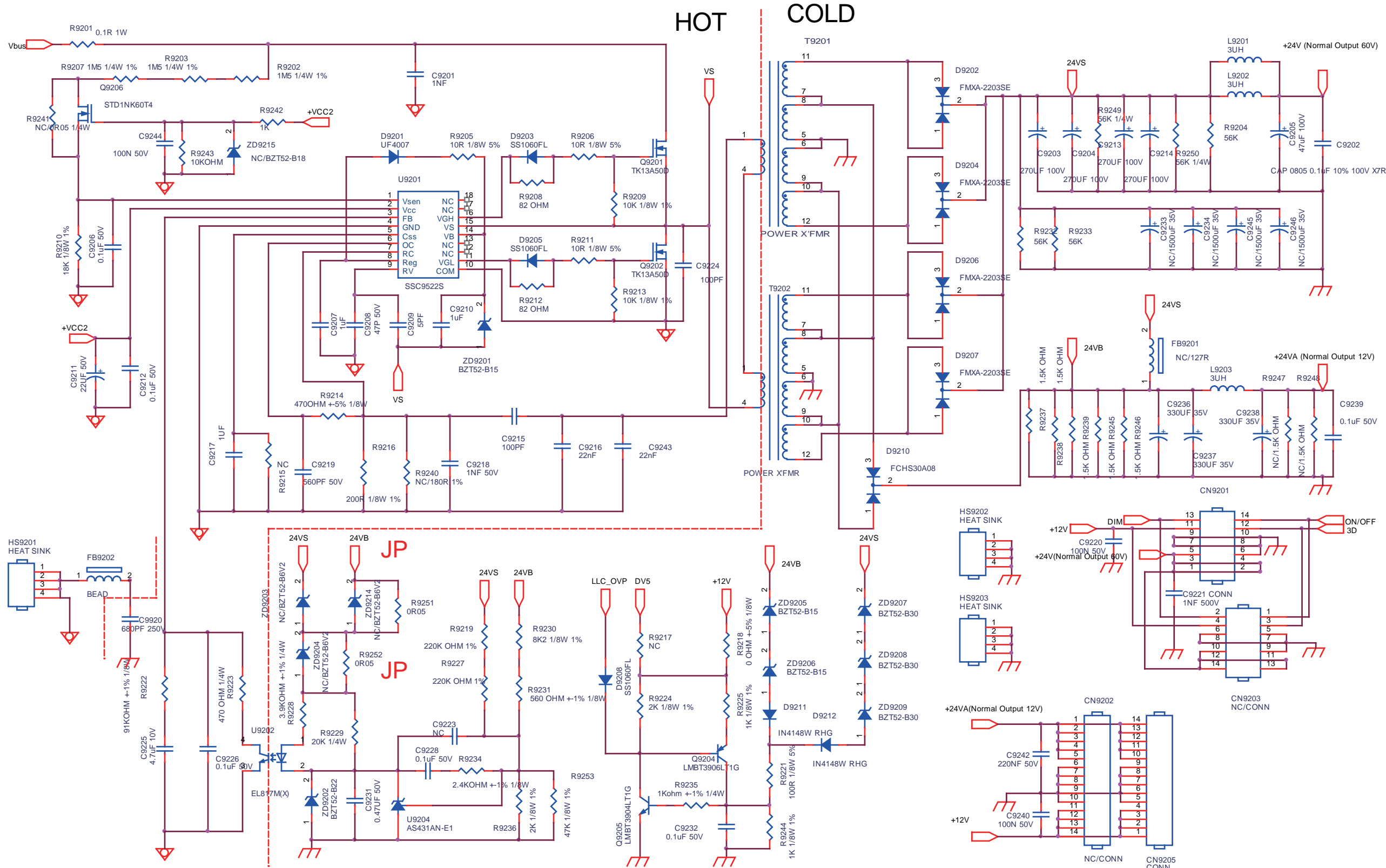
A03



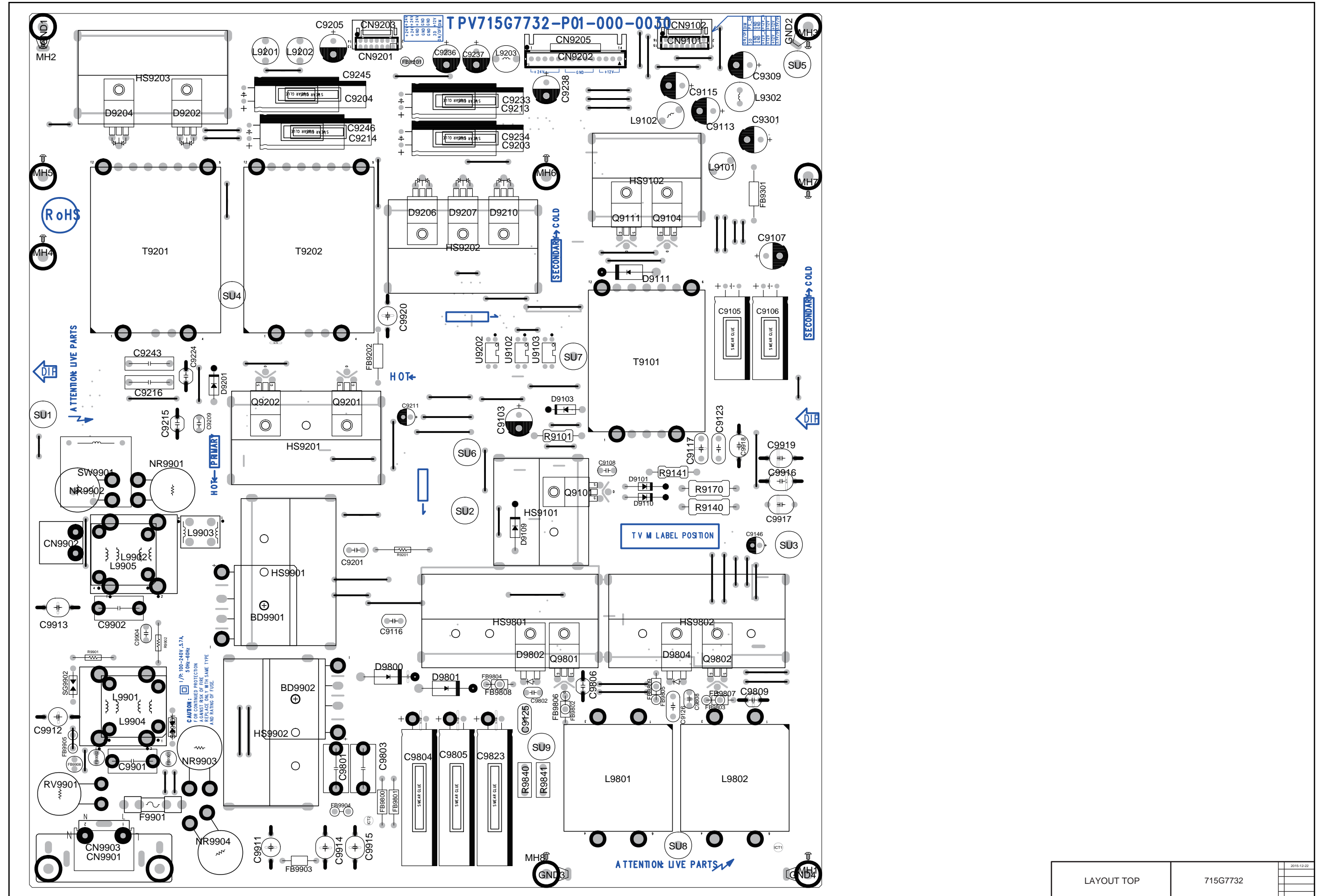
A04

LLC with Sanken

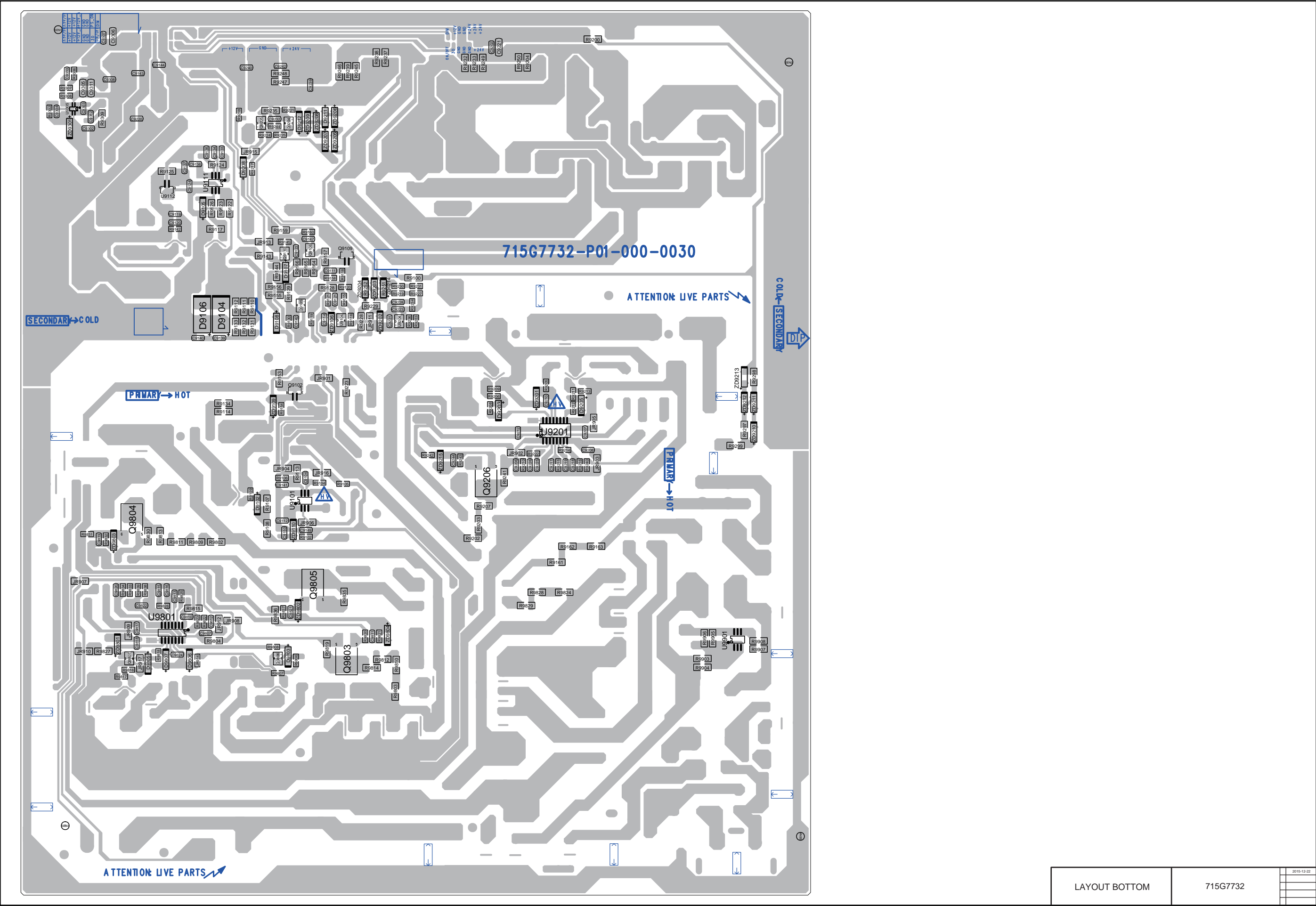
A04



10-7-5 Power layout top

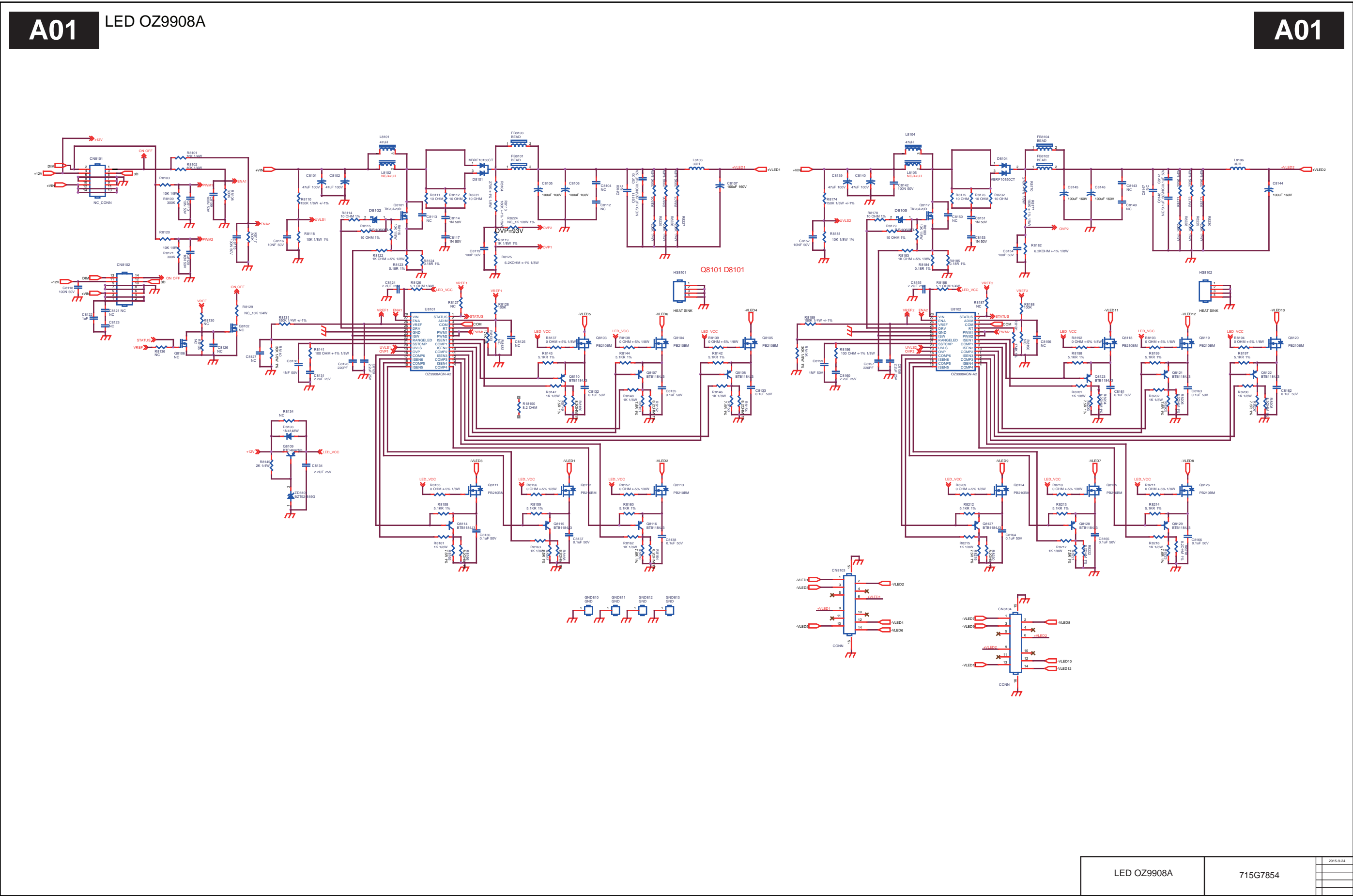


10-7-6 Power layout bottom



LAYOUT BOTTOM	715G7732	2015-12-22

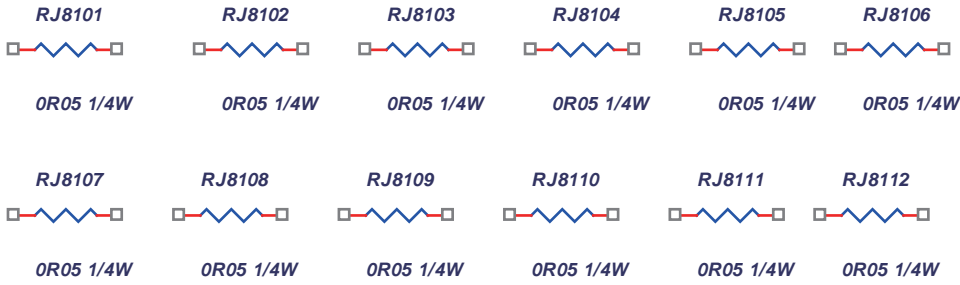
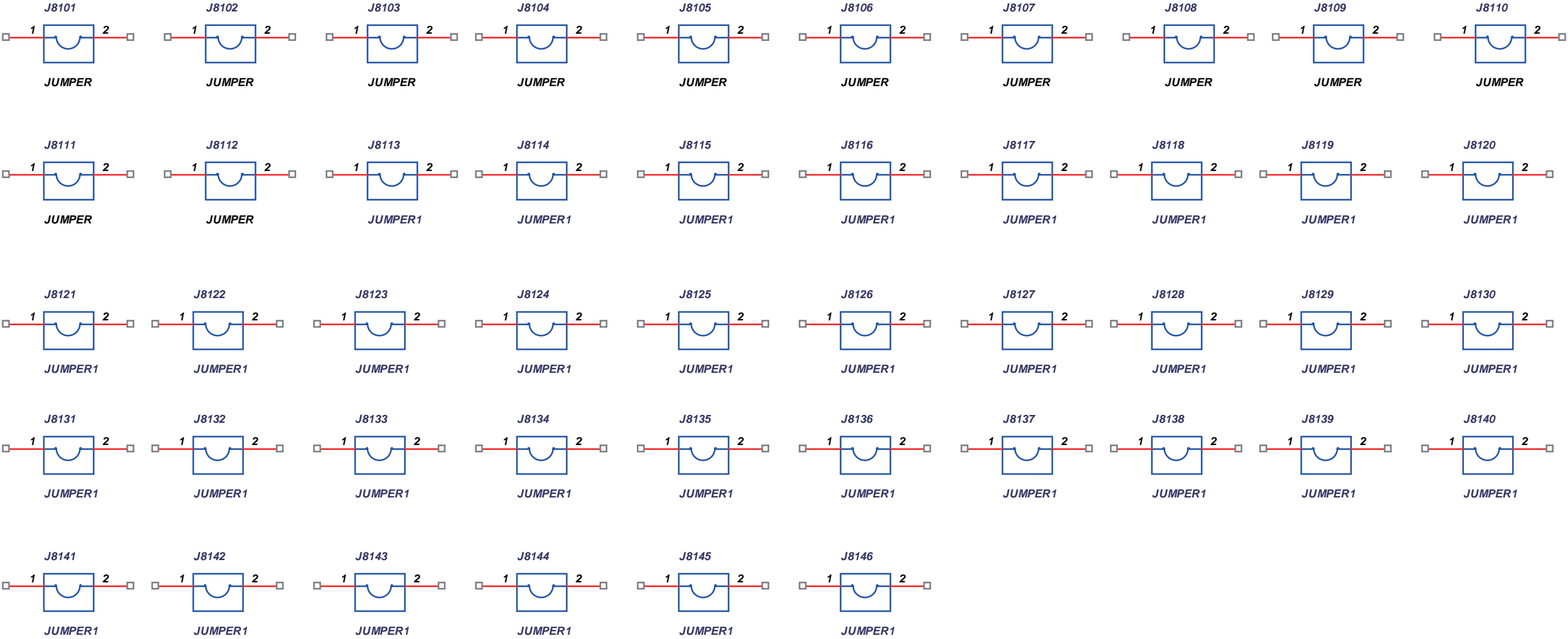
10.8 A 715G7854 PSU
10-8-1 LED OZ9908A



LED OZ9908A	715G7854	2015-9-24

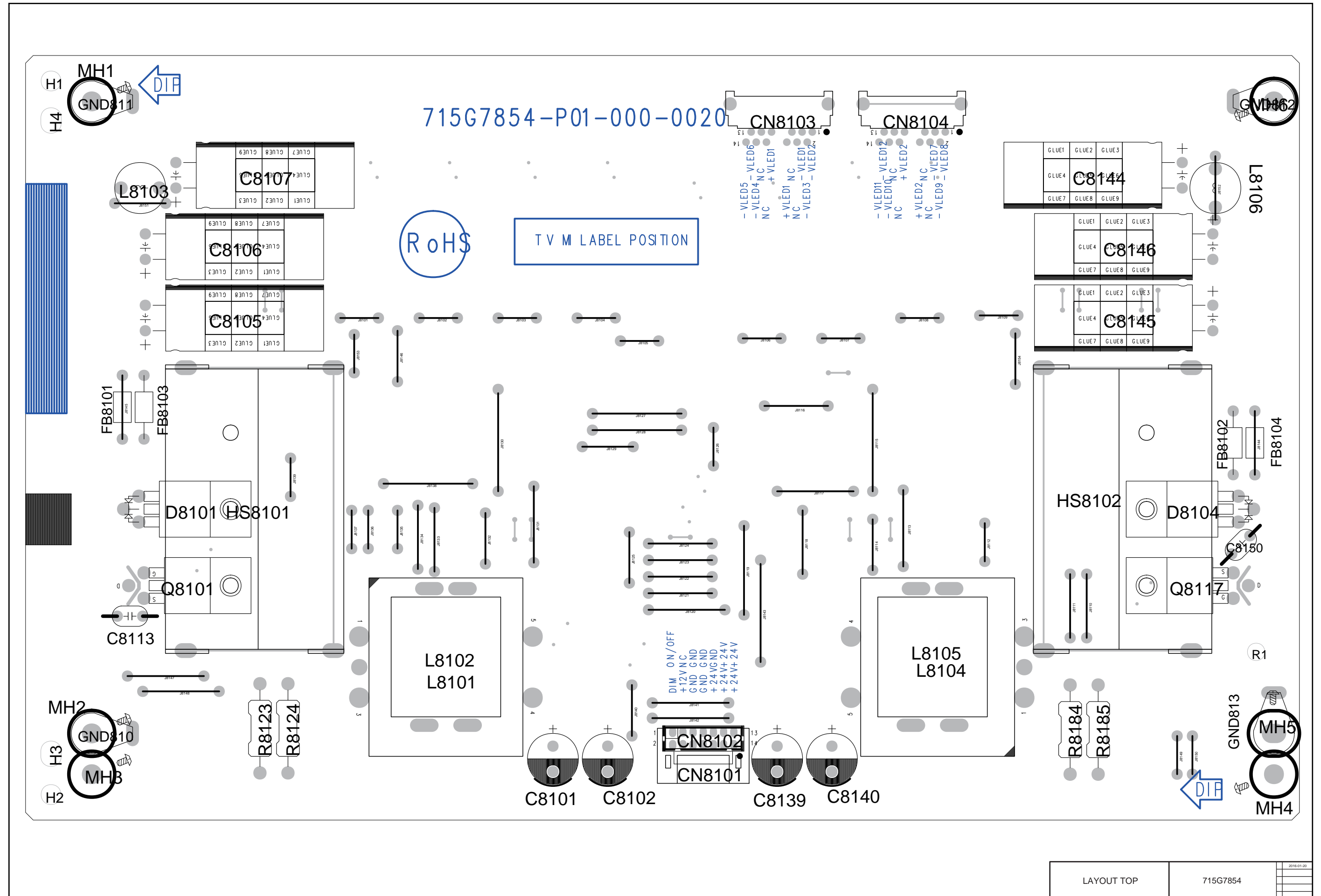
A02 JUMPER

A02

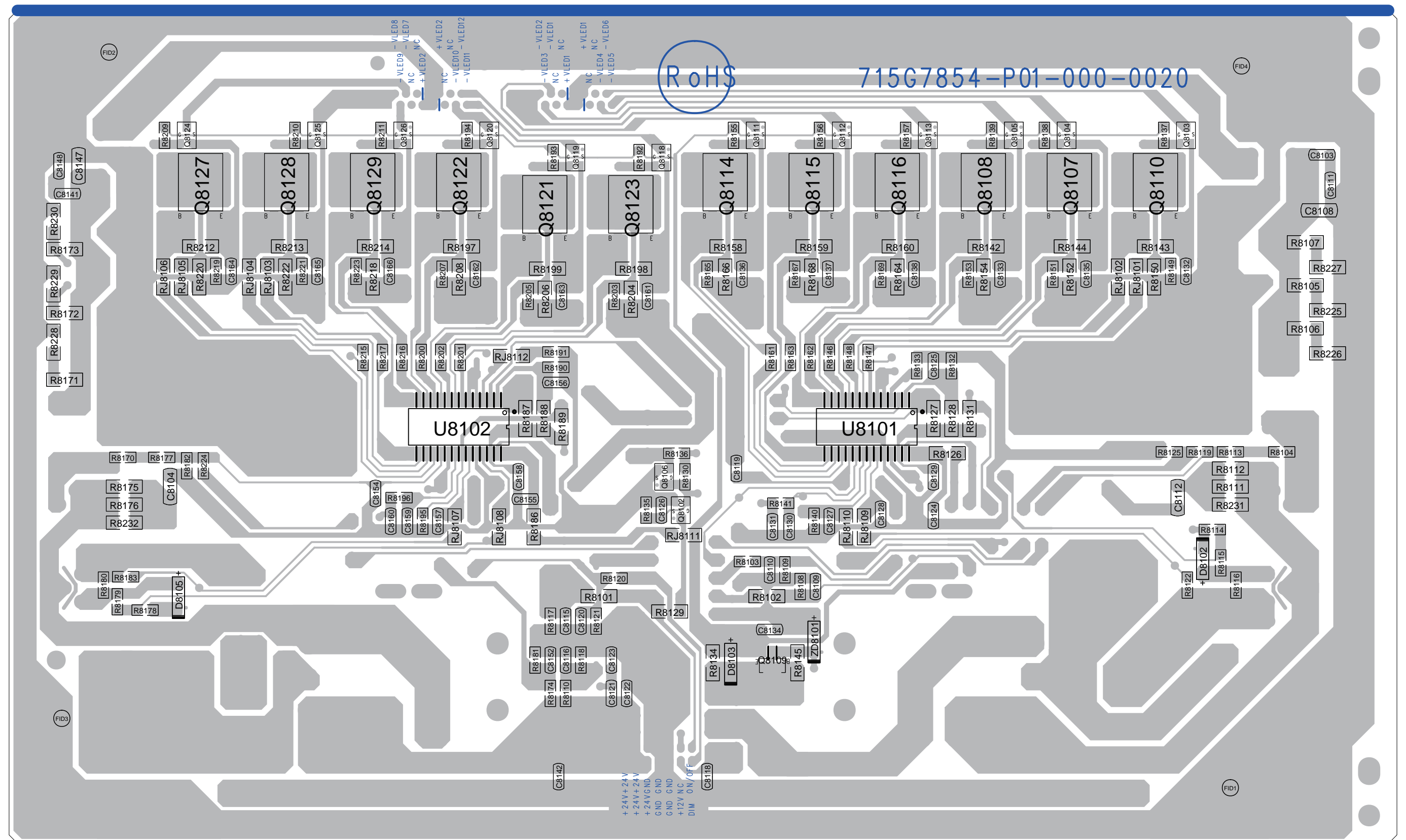


JUMPER	715G7854	2015-09-24

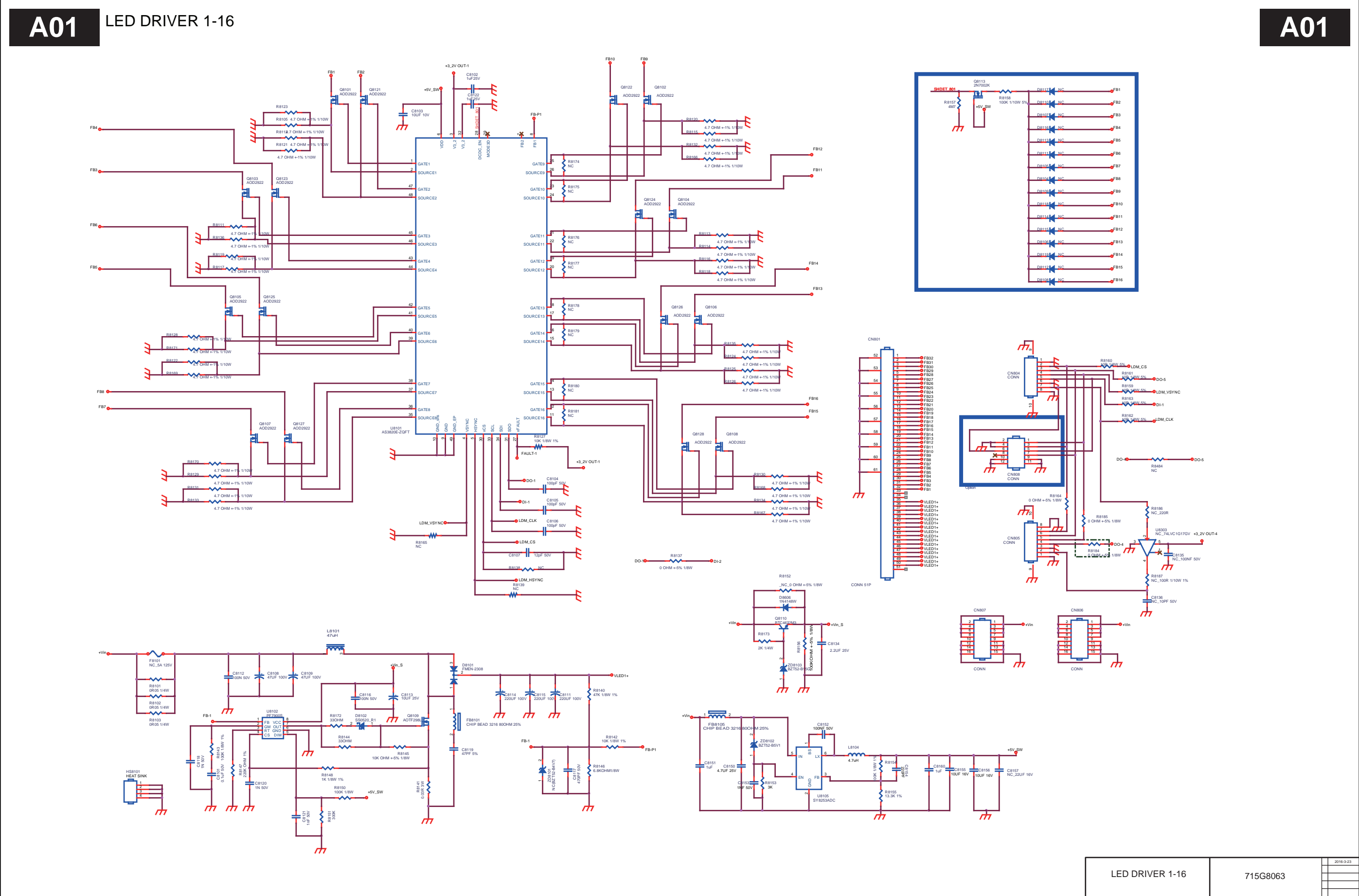
10-8-3 Power layout top



10-8-4 Power layout bottom



10.9 A 715G8063 PSU
10-9-1 LED DRIVER 1-16

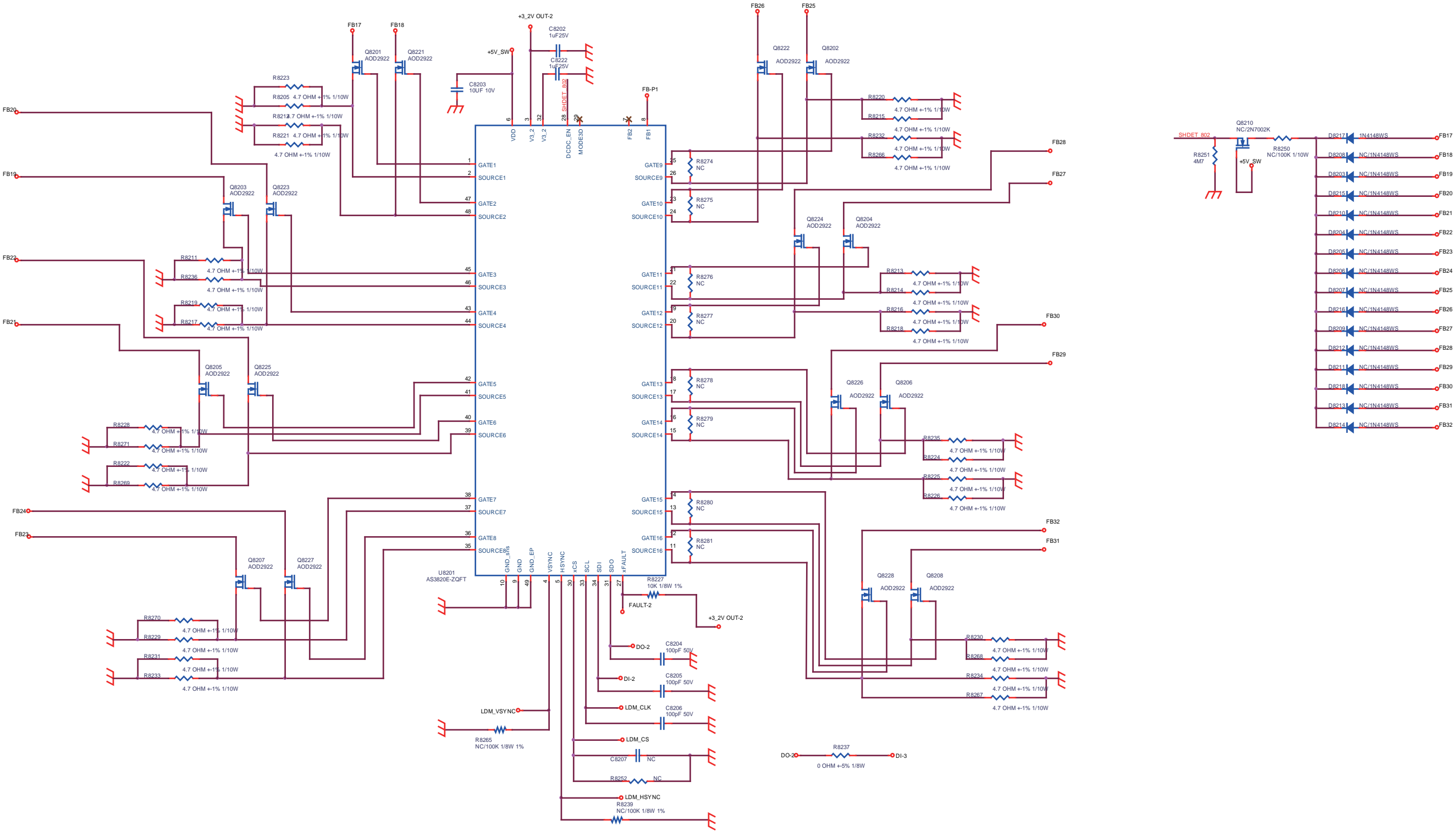


LED DRIVER 1-16	715G8063	2016-9-23

A02

LED DRIVER 17-32

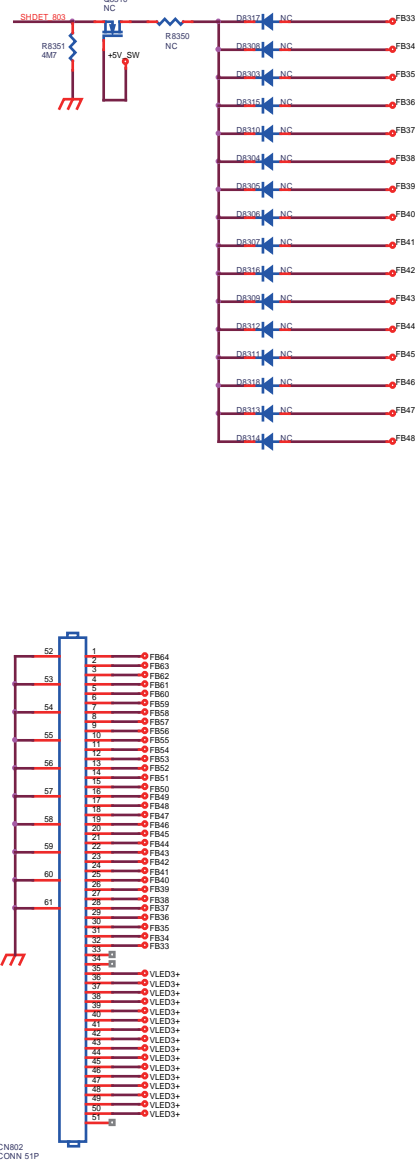
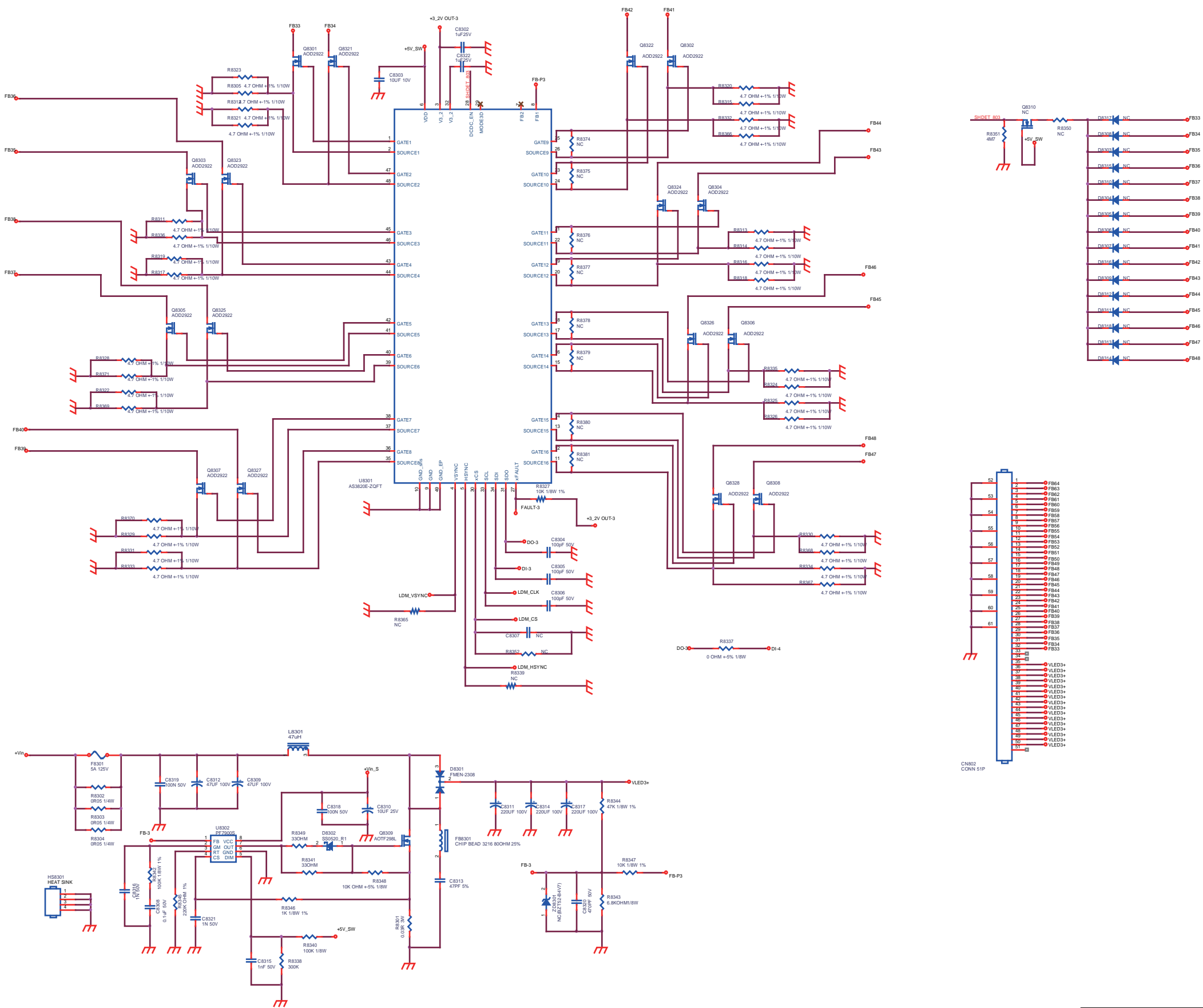
A02



A03

LED DRIVER 33-48

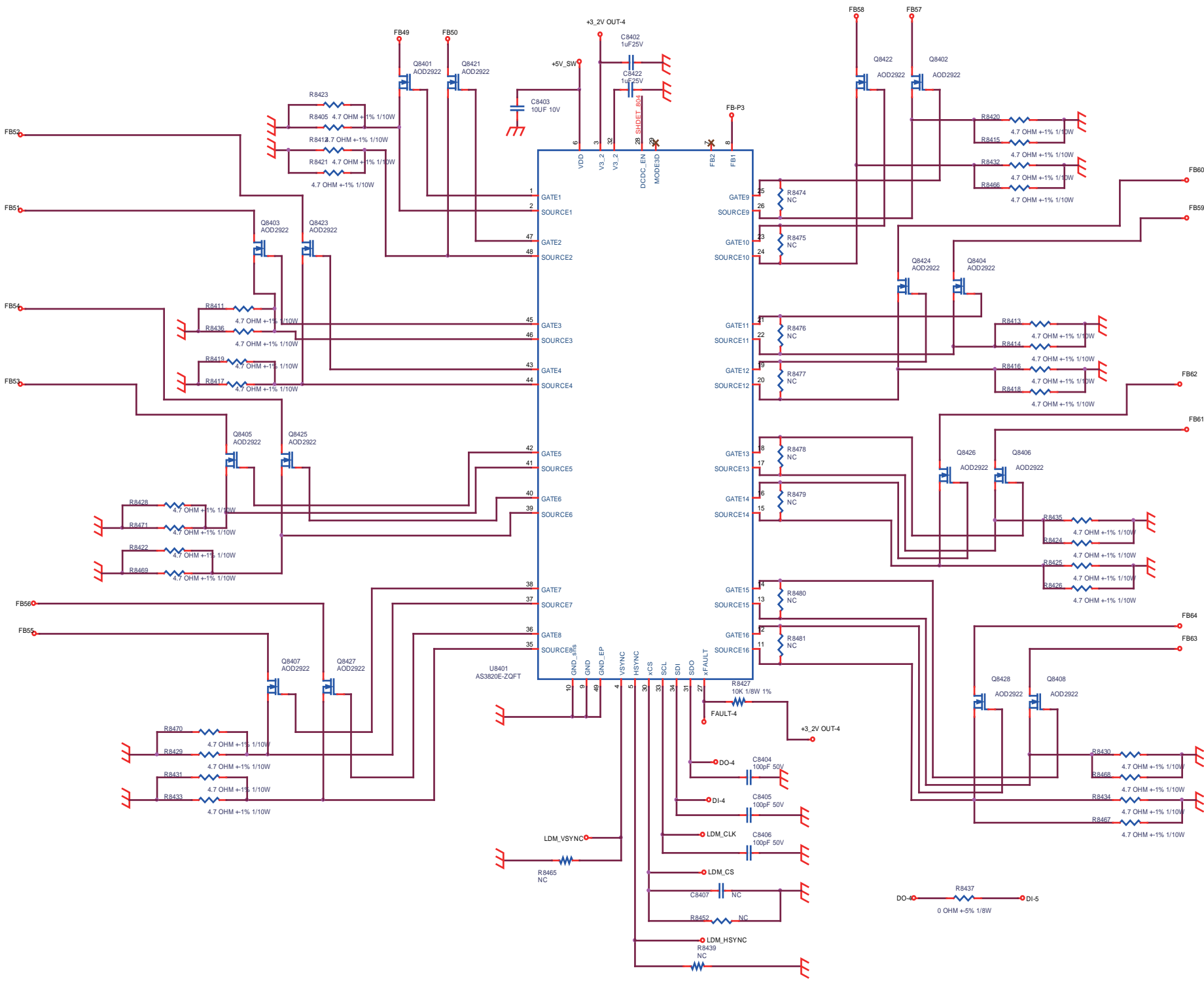
A03



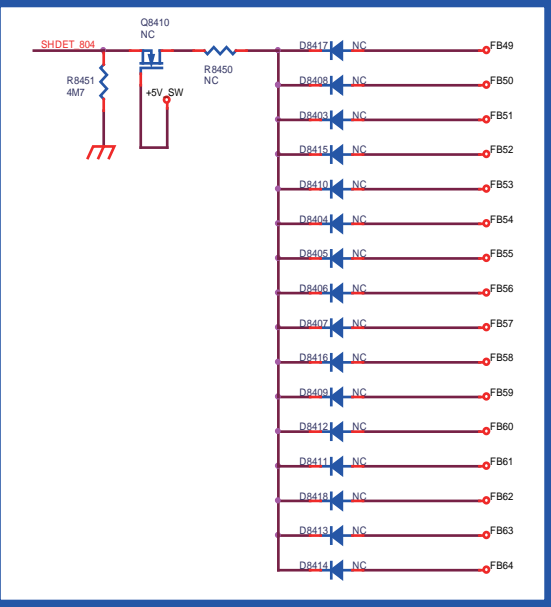
A04

LED DRIVER 49-64

A04



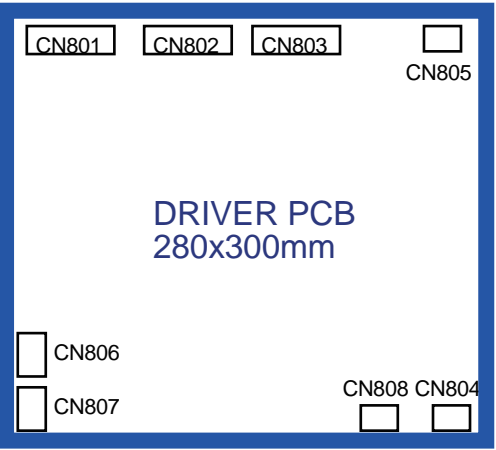
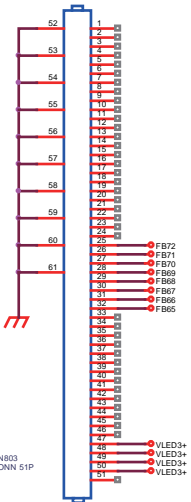
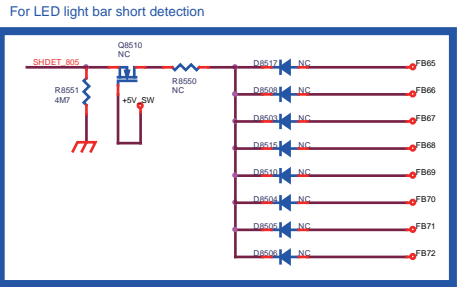
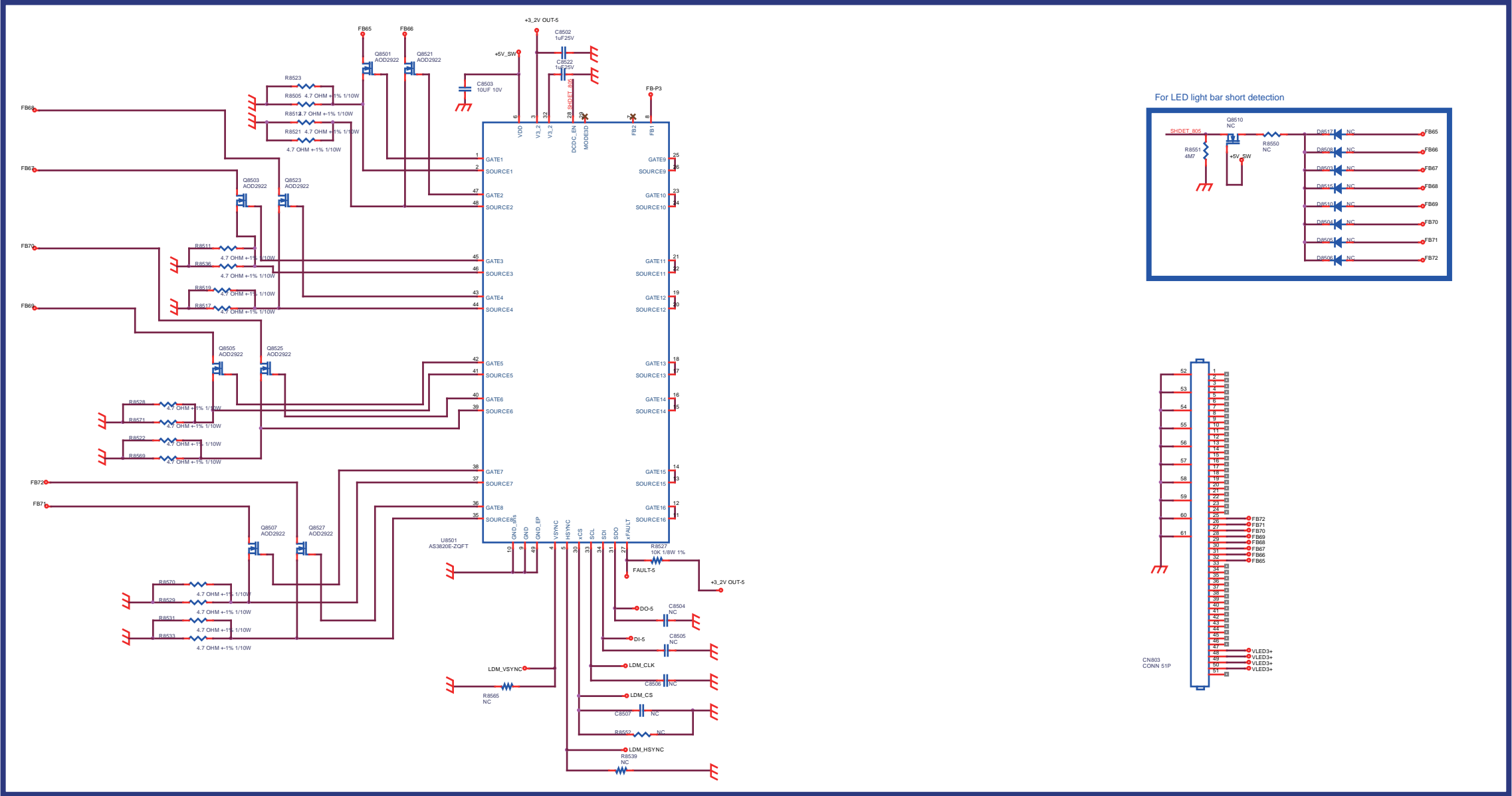
For LED light bar short detection



A05

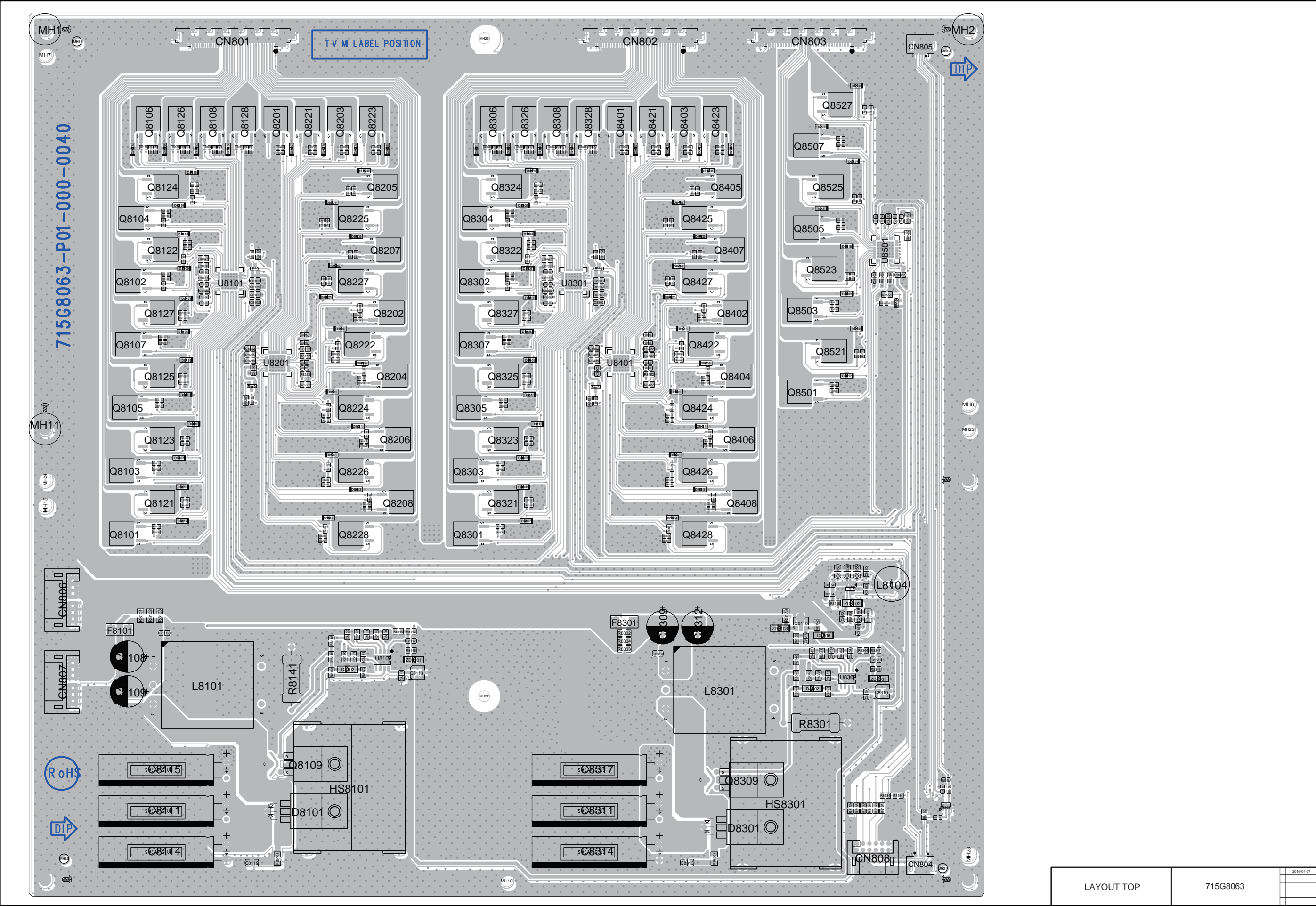
LED DRIVER 65-72

A05

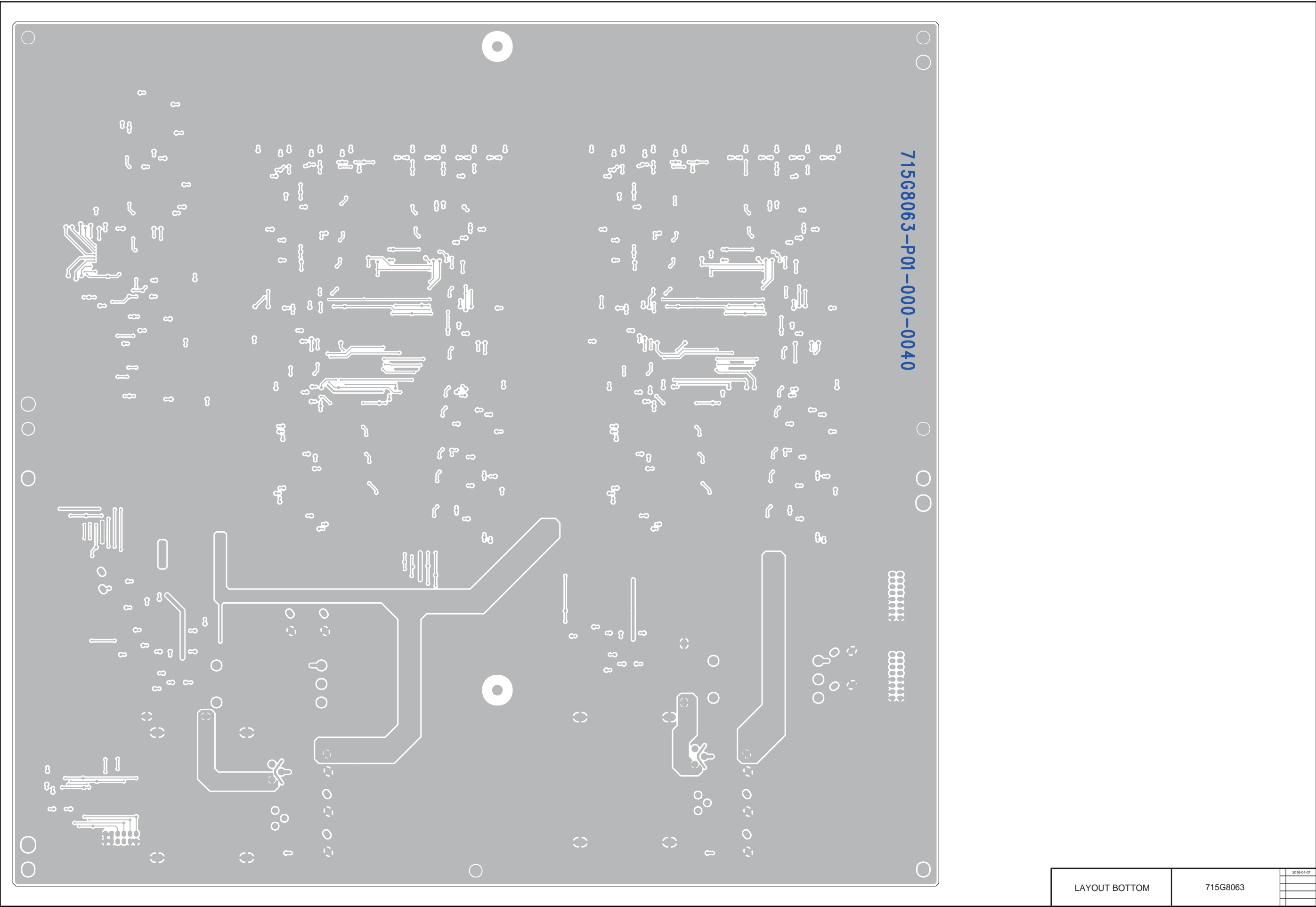


LED DRIVER 65-72	715G8063	2016-03-23

10-9-6 Power layout top



10-9-7 Power layout bottom

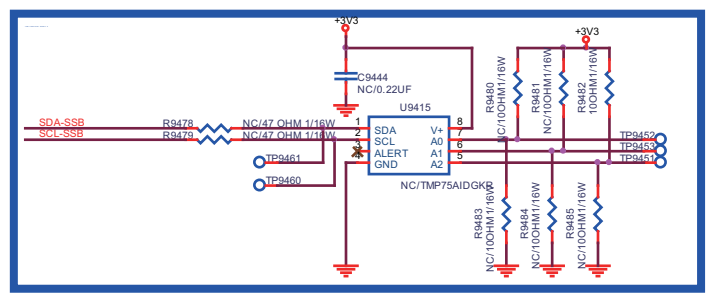
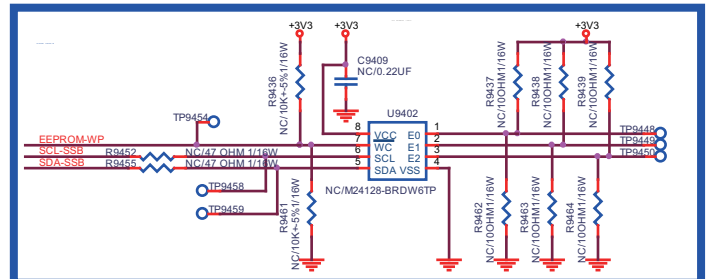
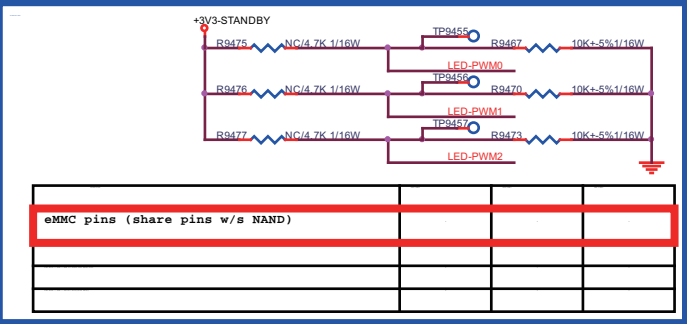
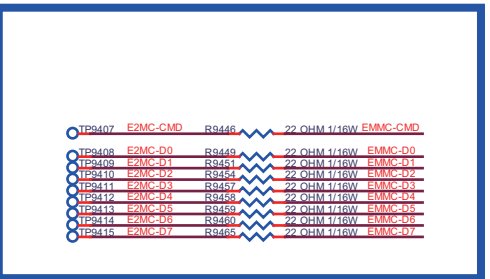
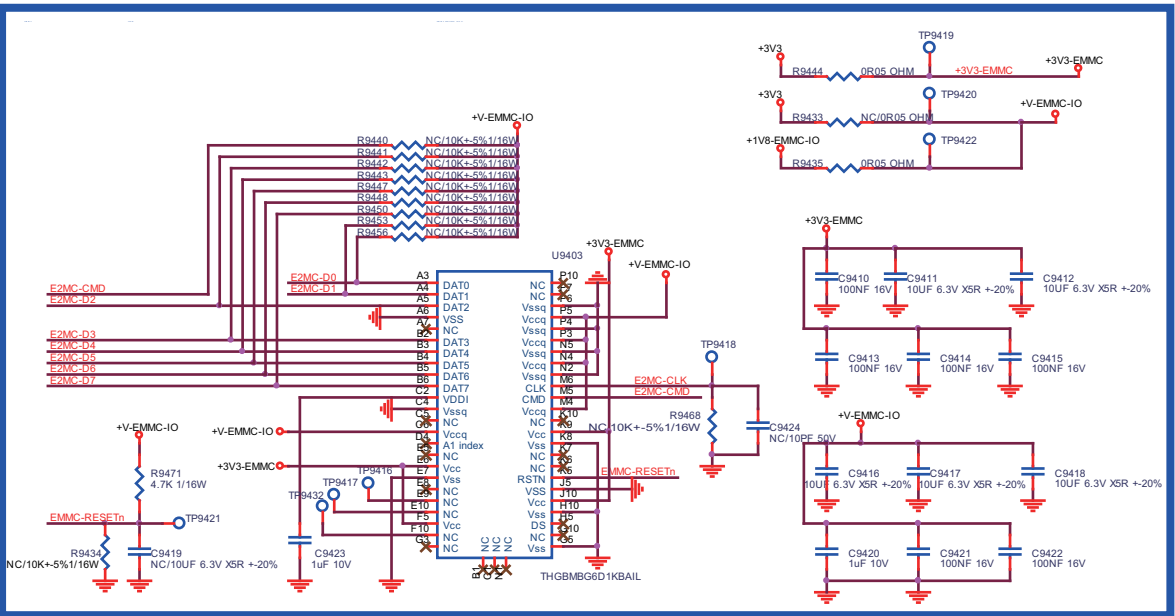
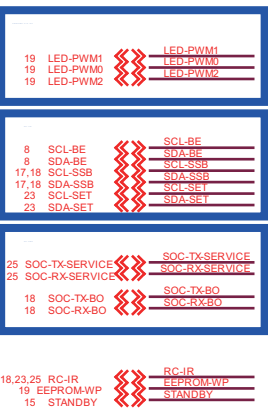
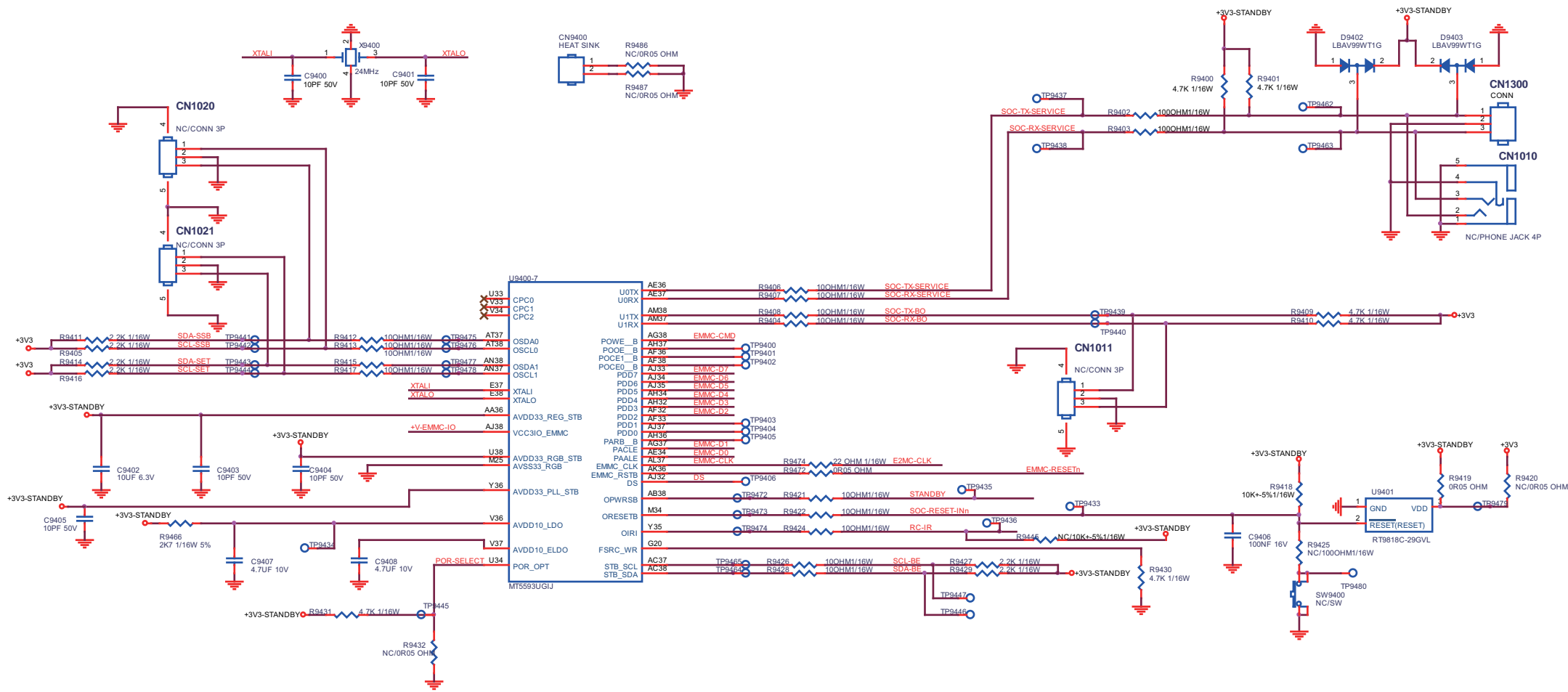


10.10 B 715G7776 SSB
10-10-1 SOC-EMMC

B01

SOC-EMMC

B01



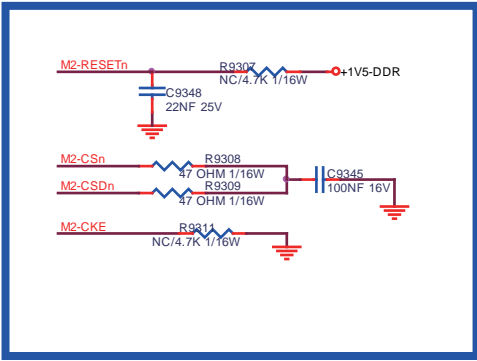
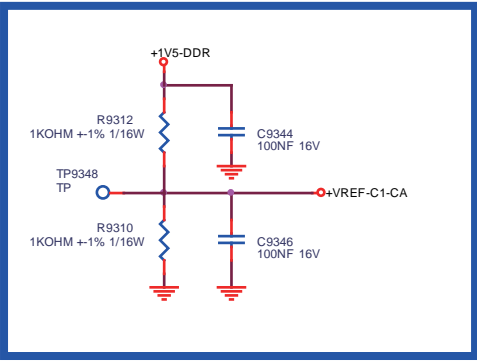
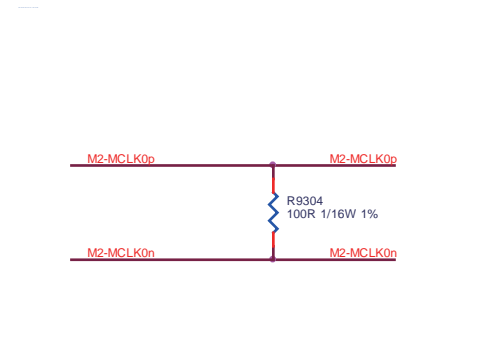
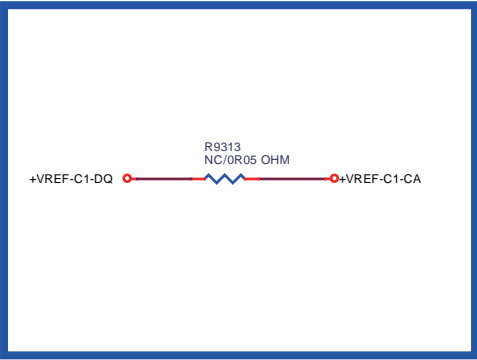
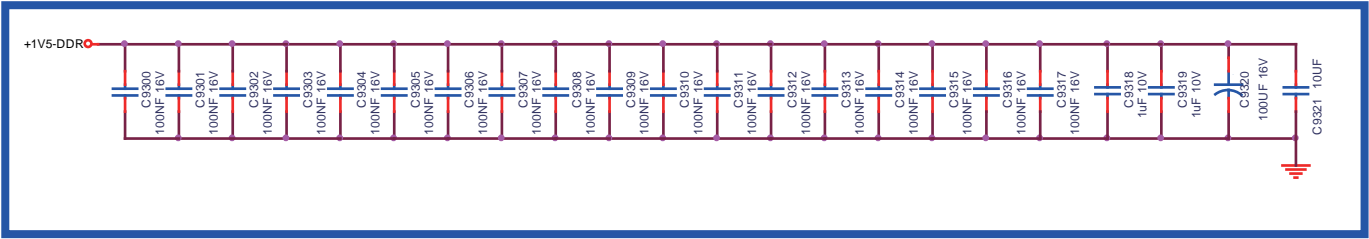
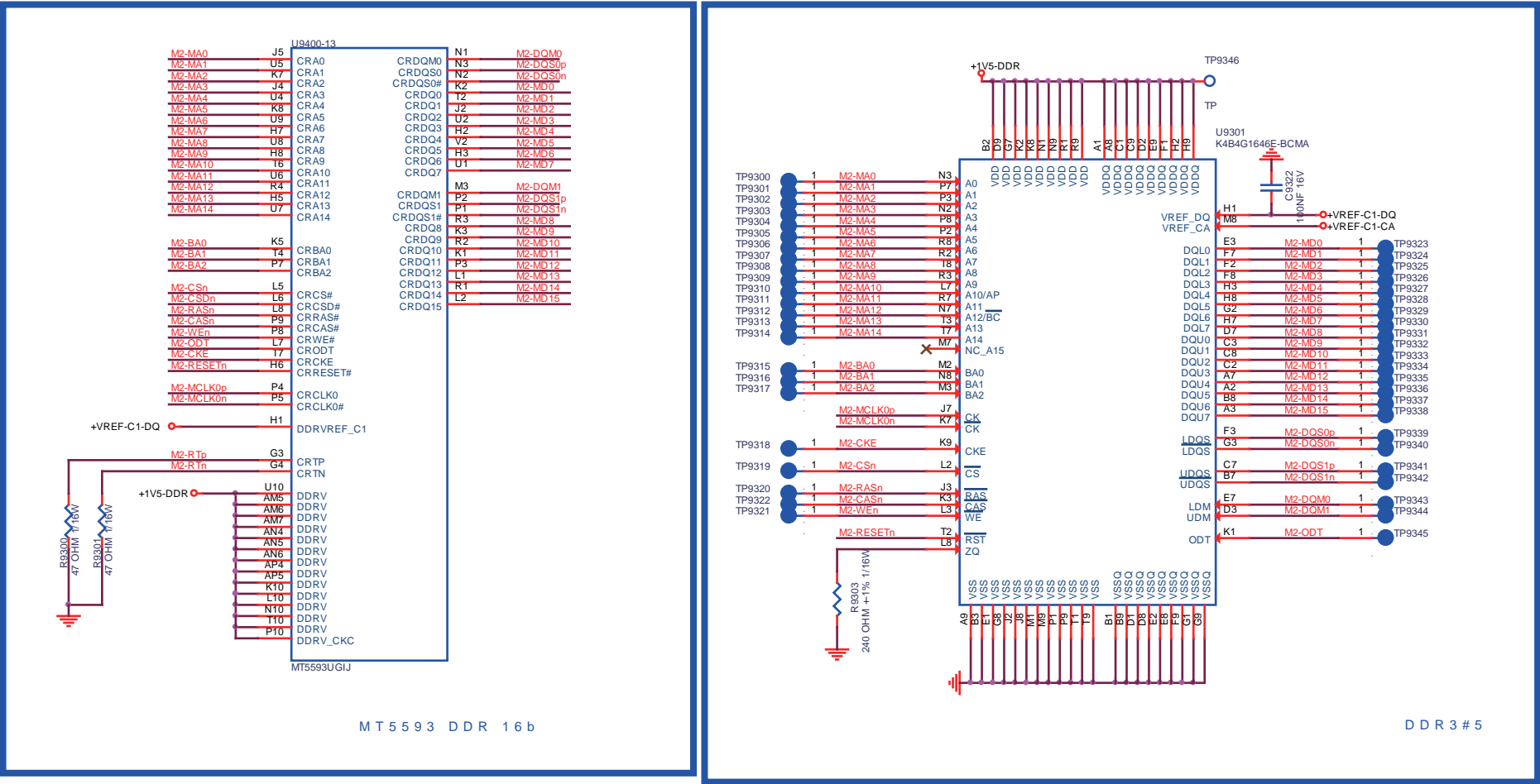
SOC-EMMC

715G7776

B04

SOC-DDR3-5

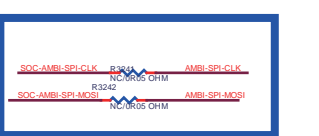
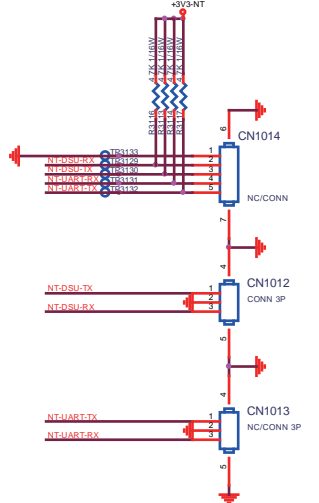
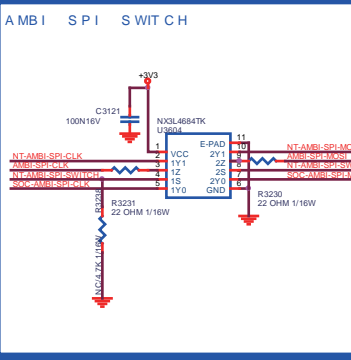
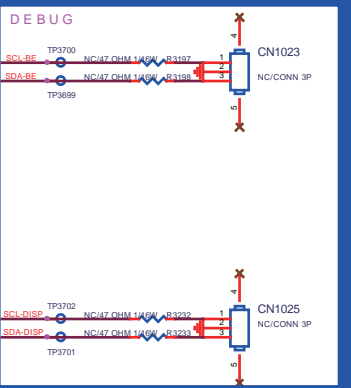
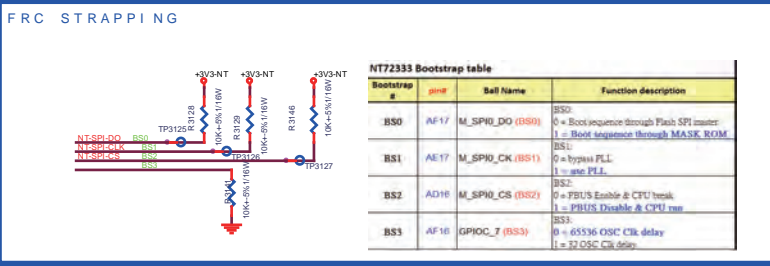
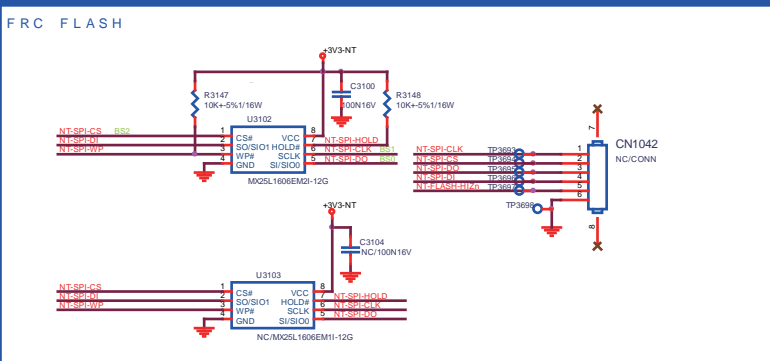
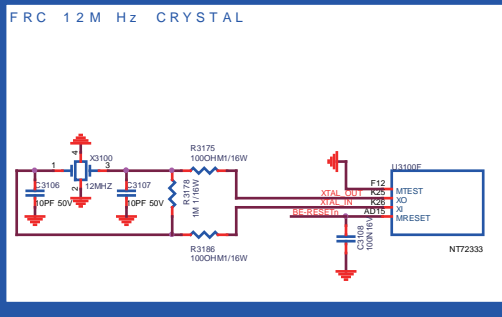
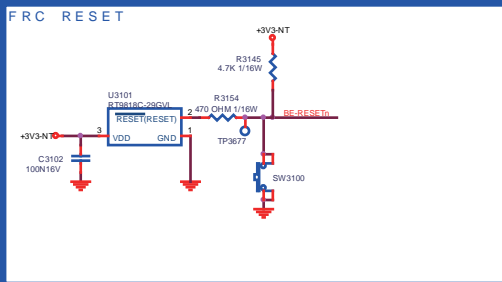
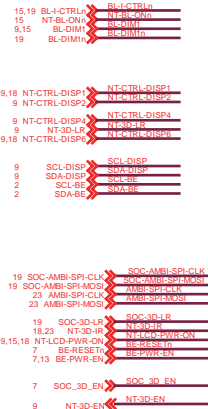
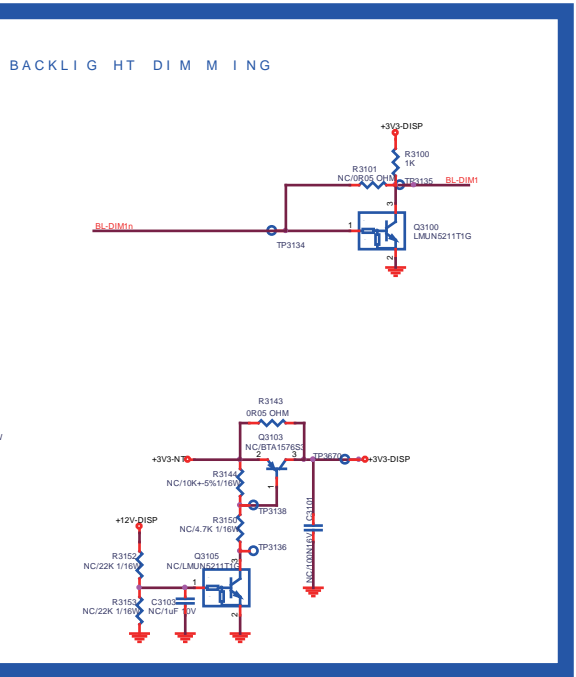
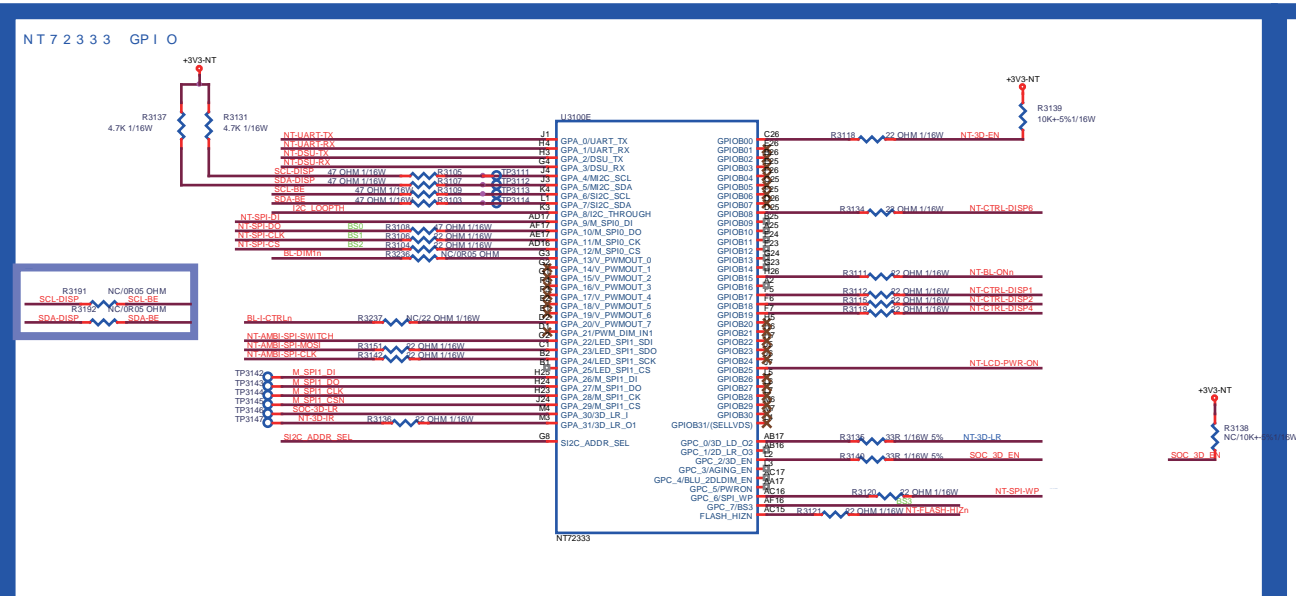
B04



B07

BE-NT72333b-GPIO

B07



NT72333 Bootstrap table

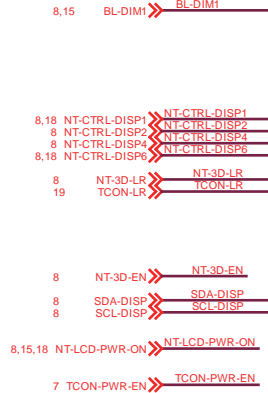
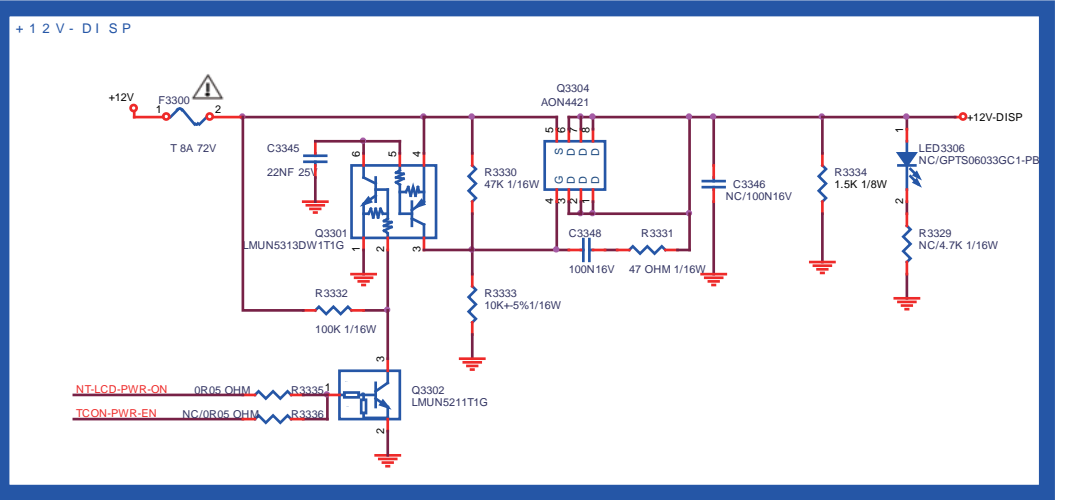
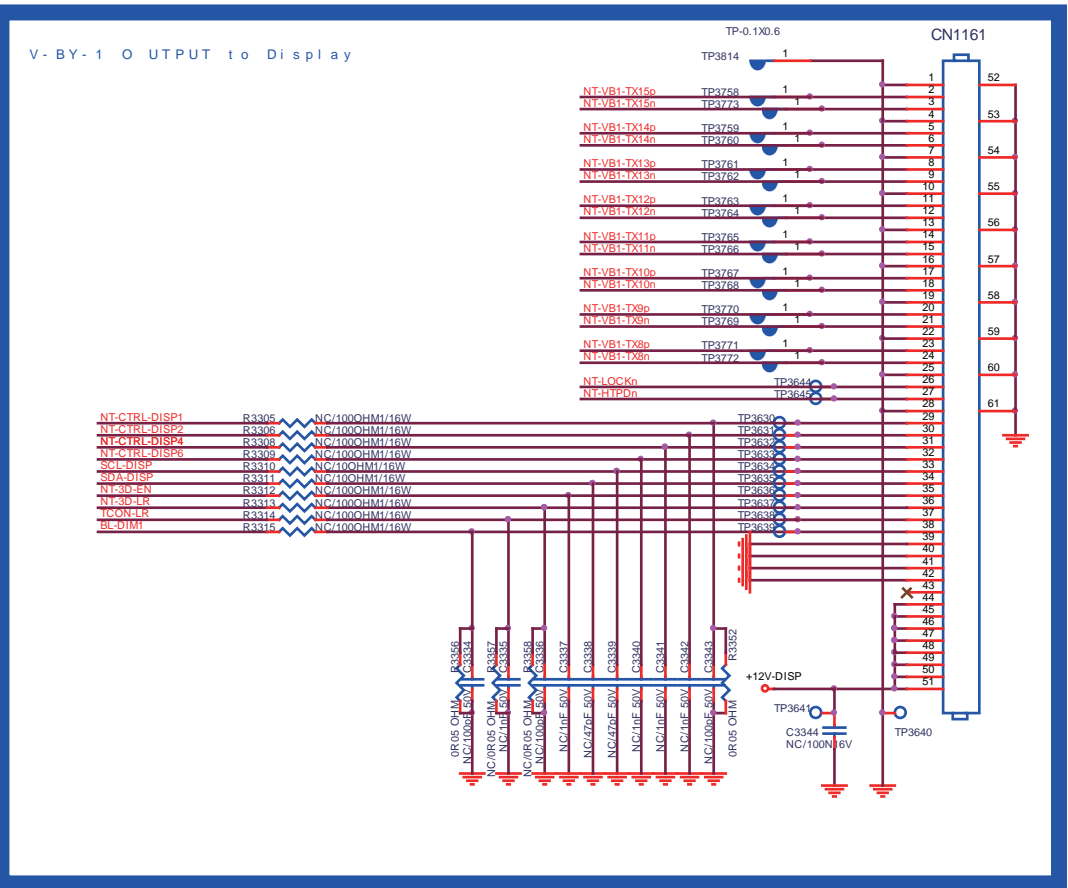
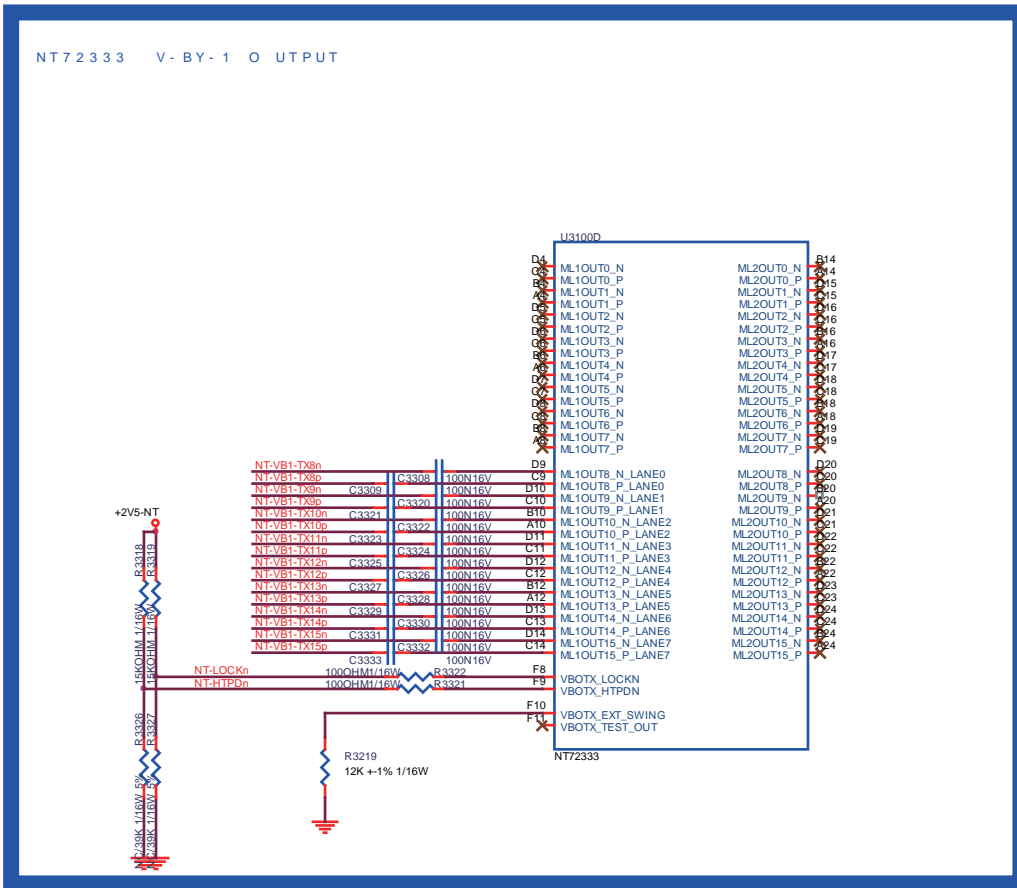
Bootstrap #	pin#	Ball Name	Function description
BS0	AF17	M_SPW0_DO (BS0)	0 = Boot sequence through Flash SPI master 1 = Boot sequence through MASK ROM
BS1	AE17	M_SPW0_CS (BS1)	0 = bypass PLL 1 = enter PLL
BS2	AD16	M_SPW0_CS (BS2)	0 = FBUS Enable & CPU reset 1 = FBUS Disable & CPU reset
BS3	AF16	GPIOC_7 (BS3)	0 = 65536 OSC CLK delay 1 = 32 OSC CLK delay

10-10-8 BE-NT72333c-TX-VB1

B08

BE-NT72333c-TX-VB1

B08

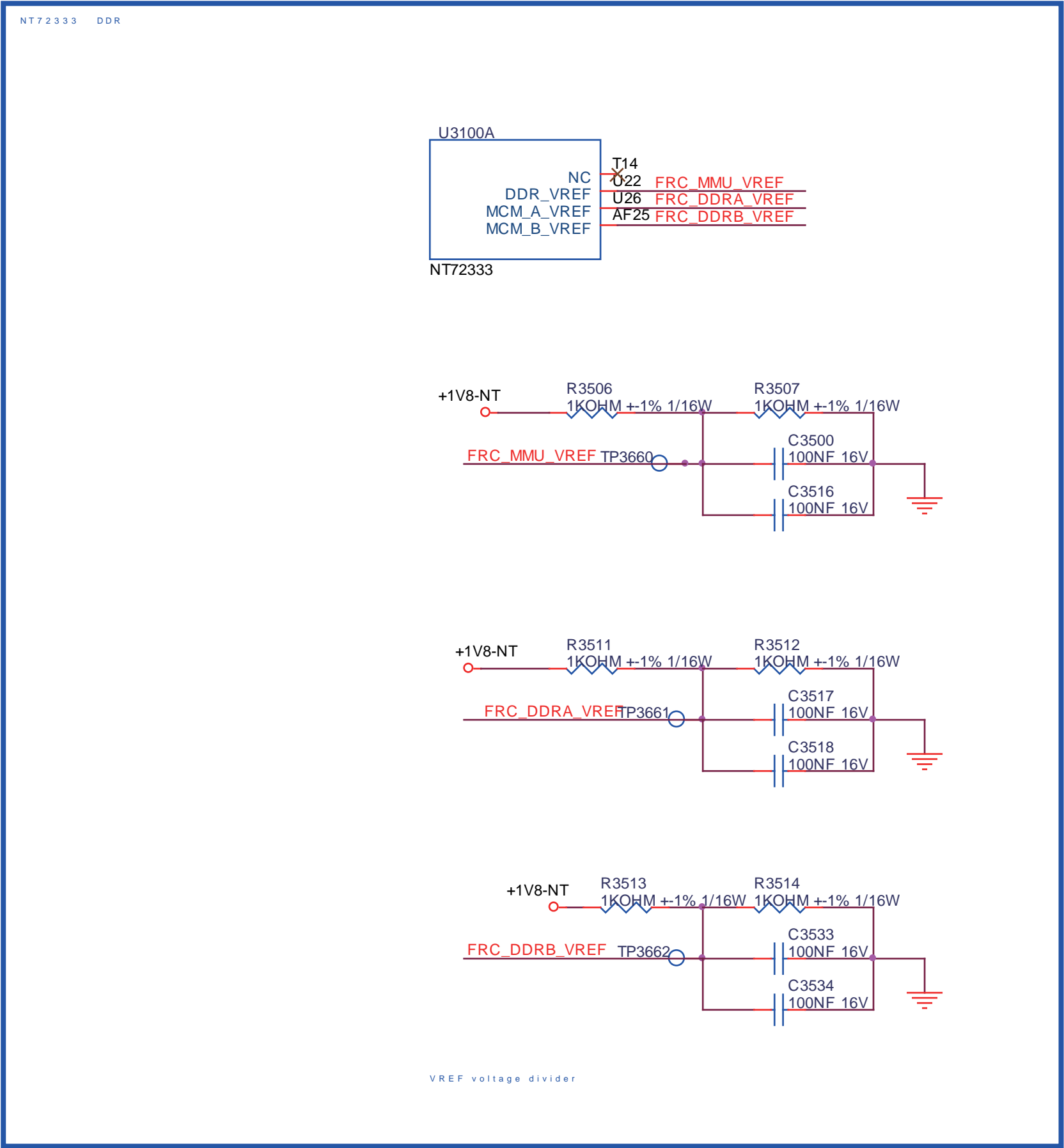


10-10-10 BE-NT72333e-DDR

B10

BE-NT72333e-DDR

B10



BE-NT72333e-DDR

715G7776

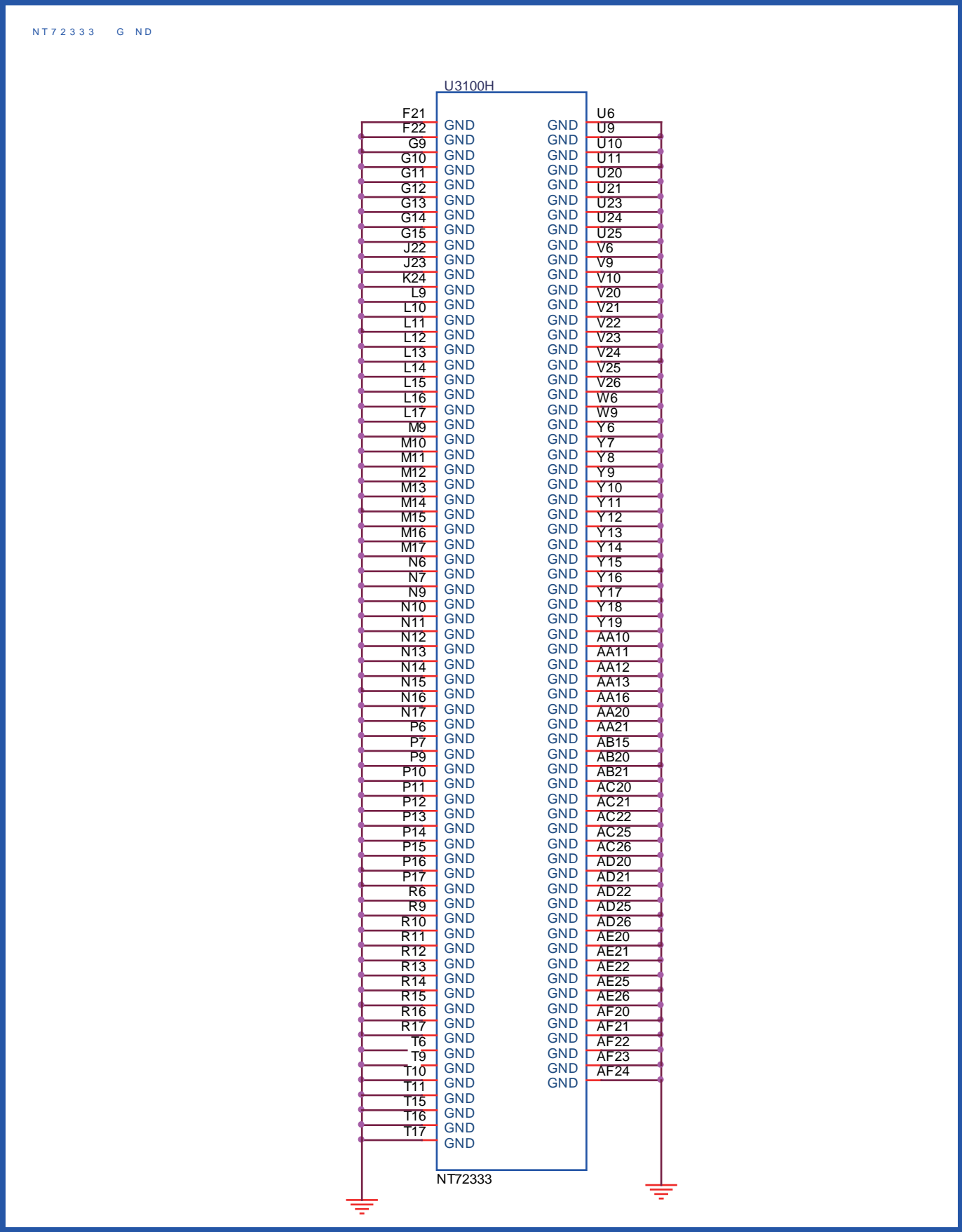
C	2019-11-25

20040_513.eps

10-10-11 BE-NT72333f-GND

B11 BE-NT72333f-GND

B11

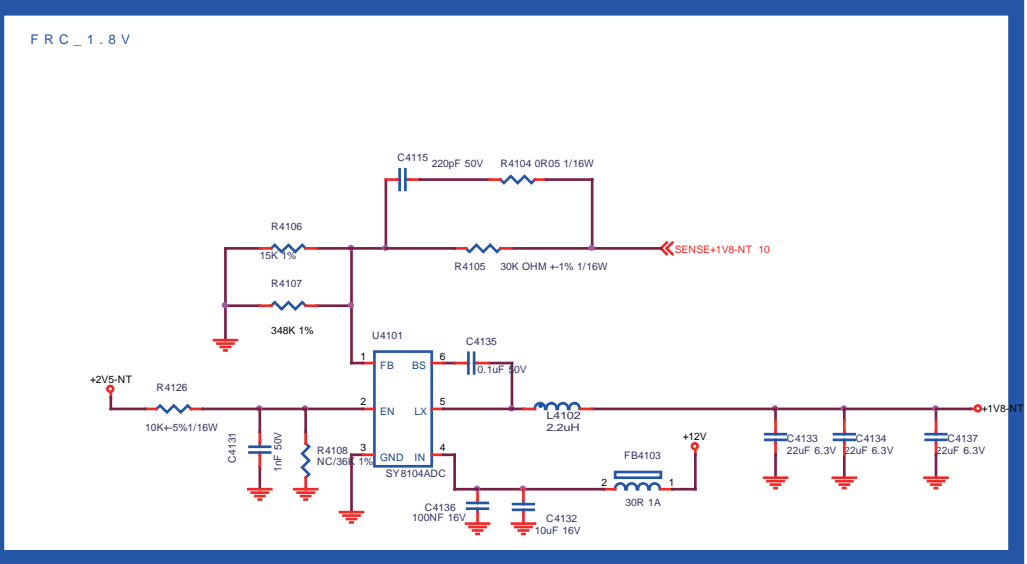
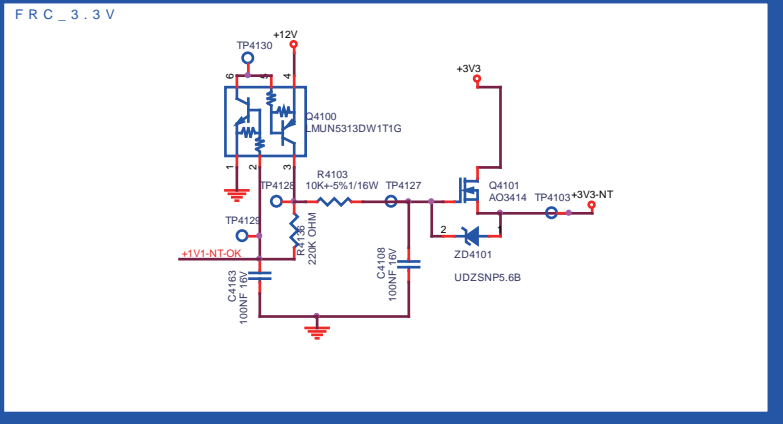
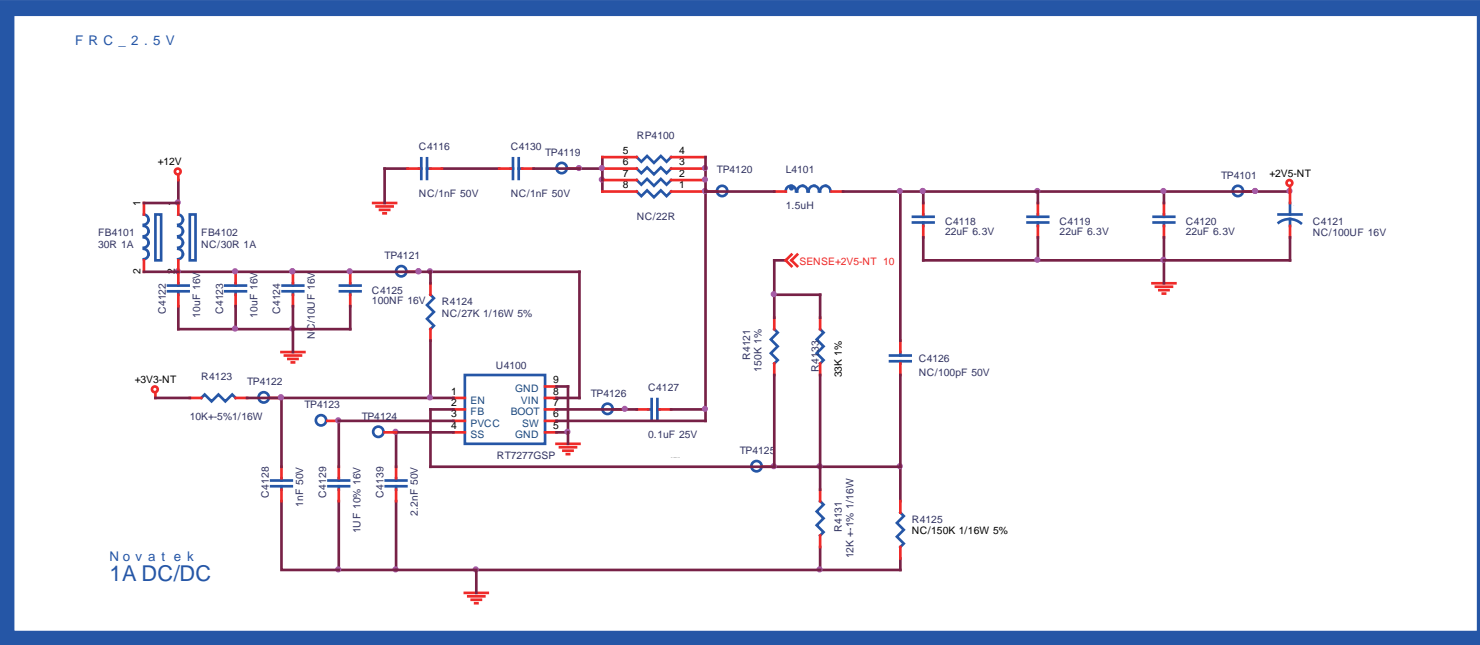
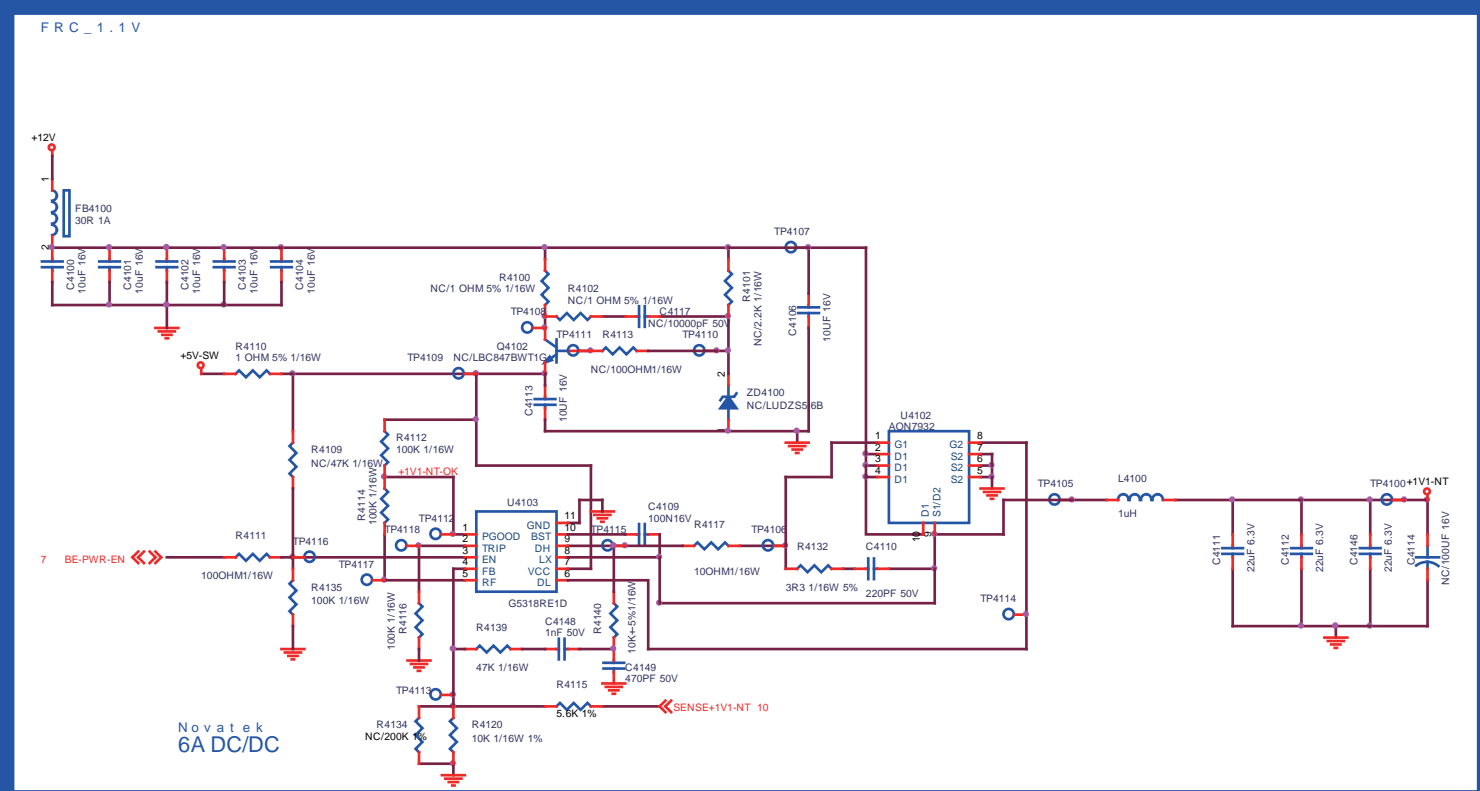


BE-NT72333f-GND	715G7776	C	2016-11-20

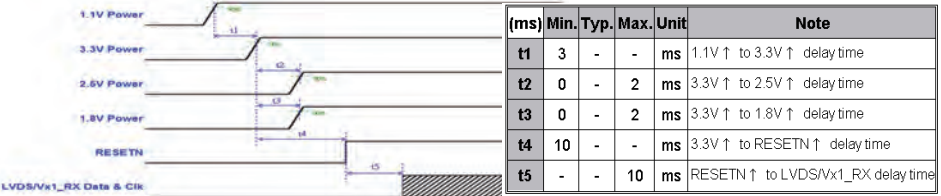
10-10-12 DCDC-Novatek-POWER

B12 DCDC-Novatek-POWER

B12



Power On Sequence Requirement:



DCDC-Novatek-POWER

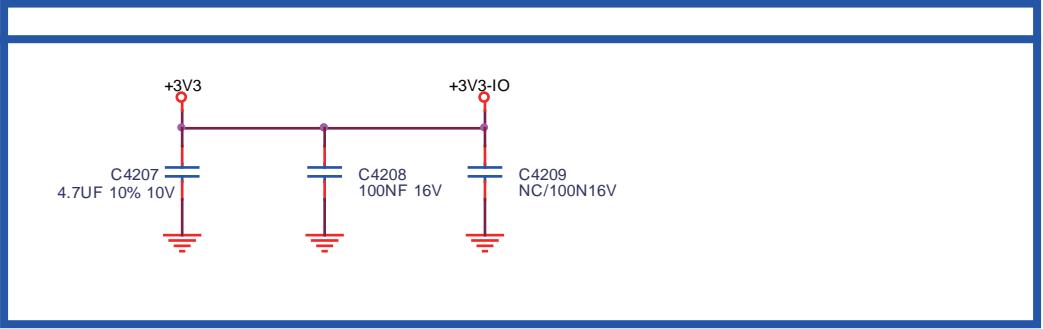
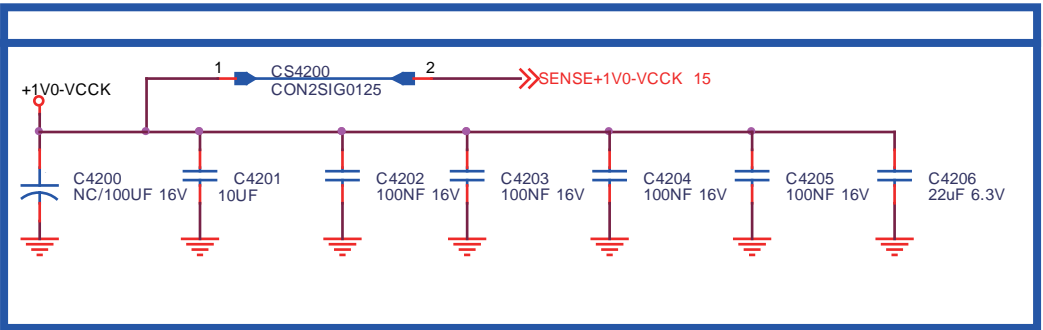
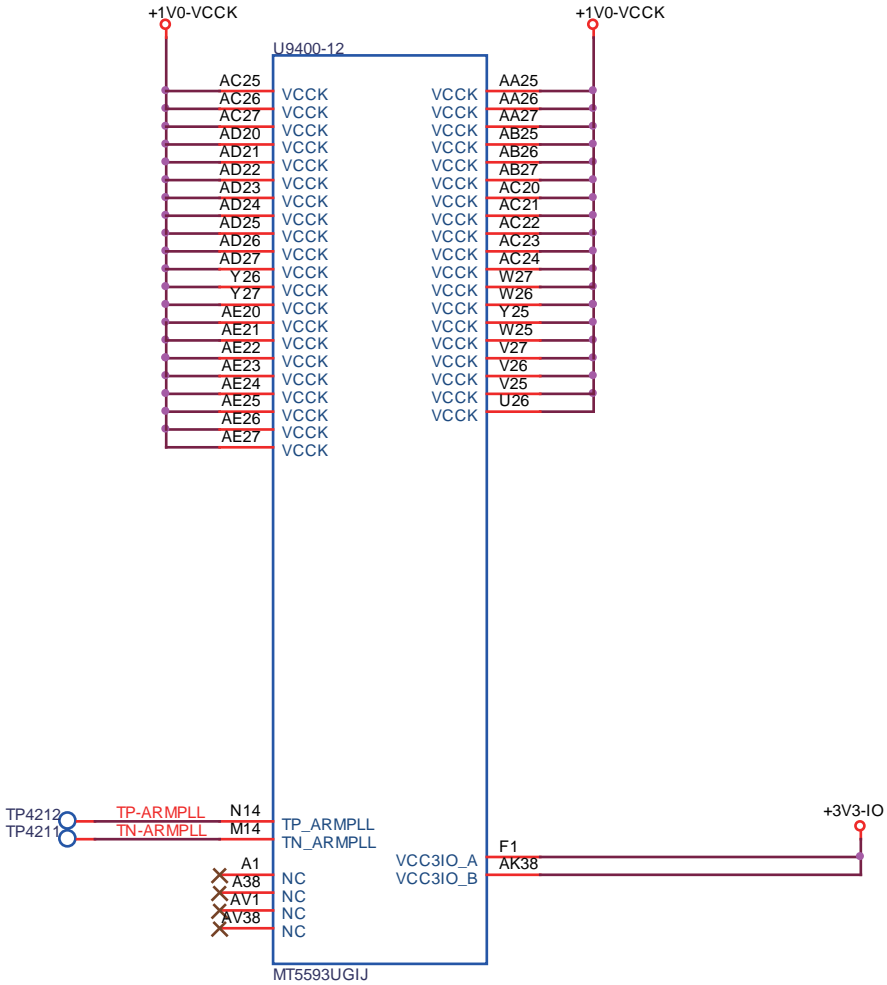
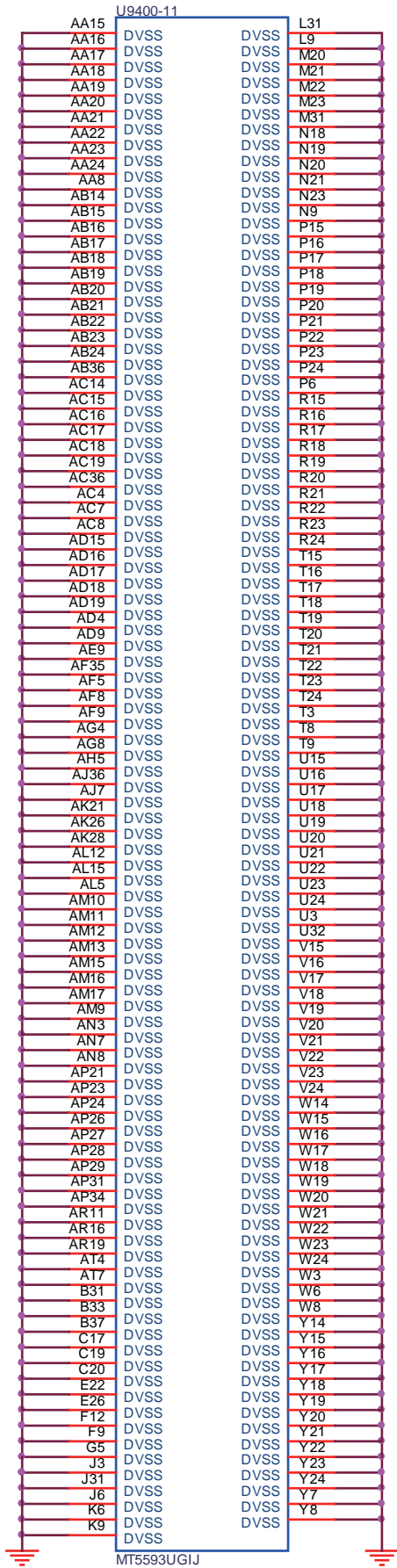
715G7776

10-10-13 DCDC-SOC-VCCK-DVSS

B13

DCDC-SOC-VCCK-DVSS

B13



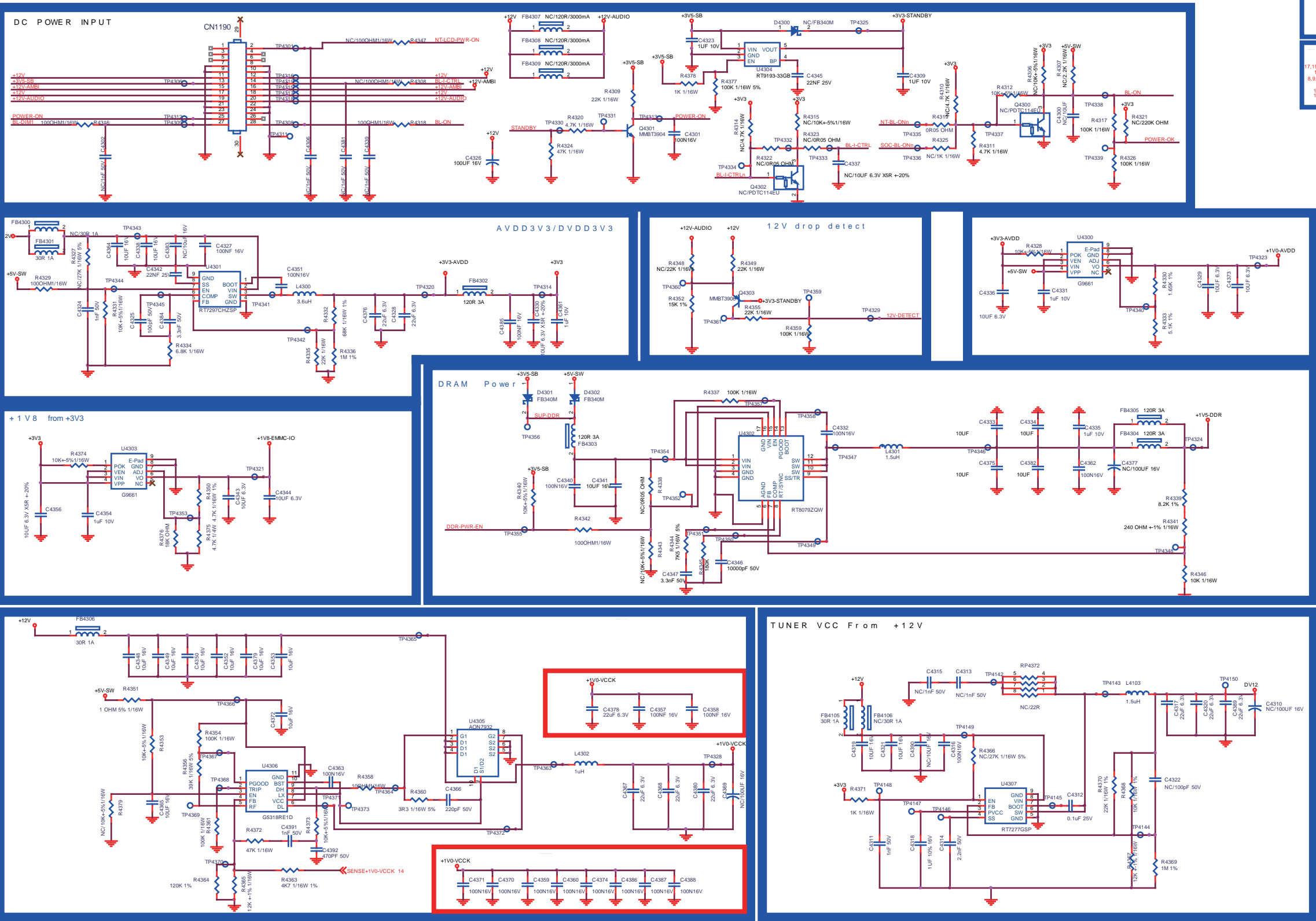
DCDC-SOC-VCCK-DVSS

715G7776

B14

DCDC-SYSTEM-POWER1

B14



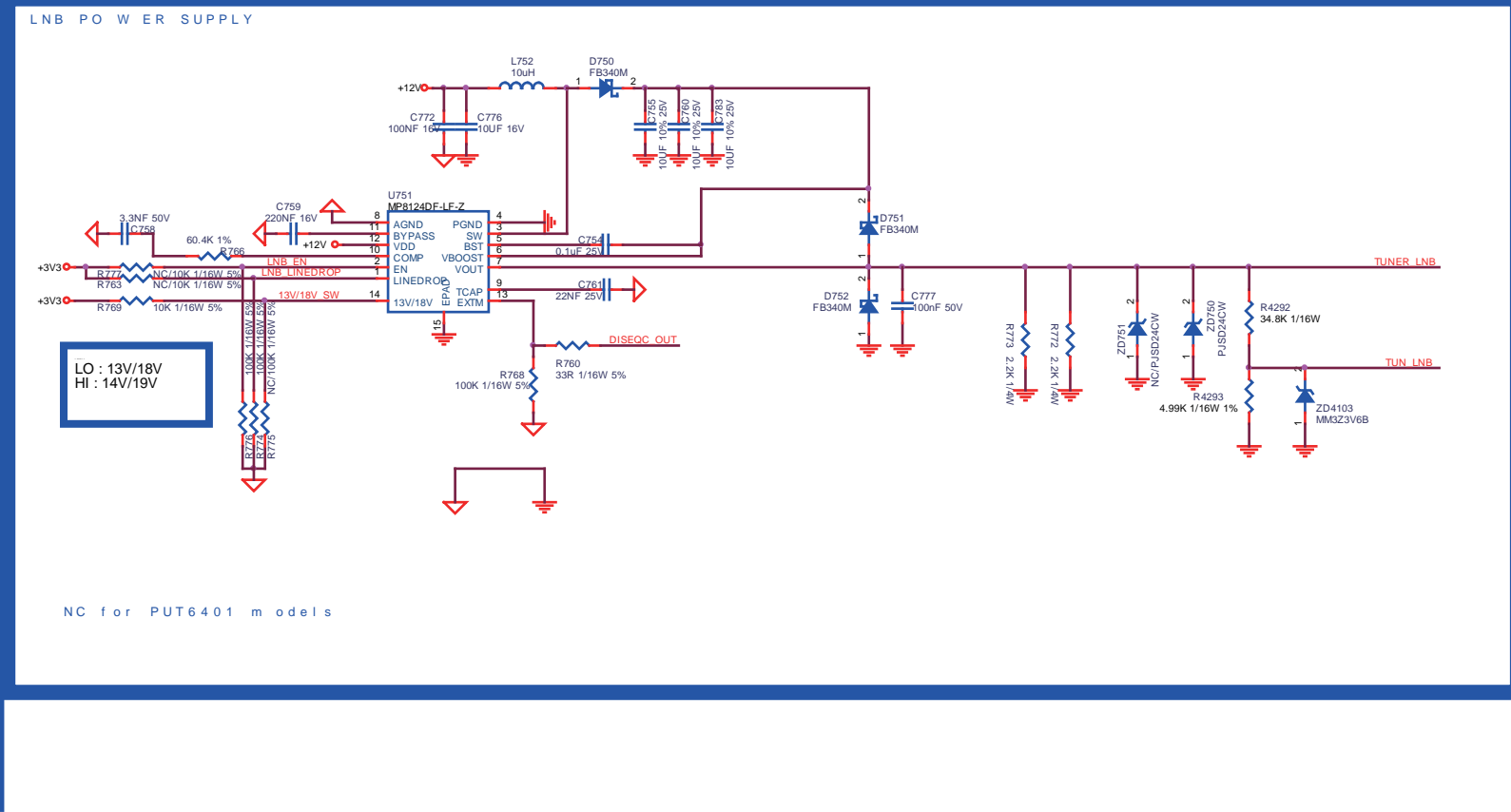
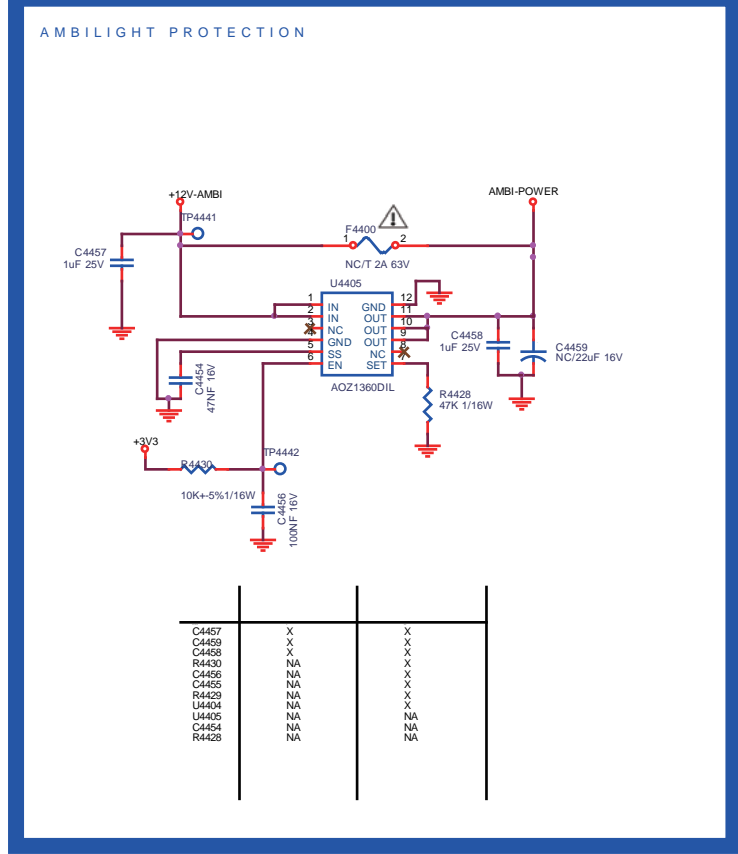
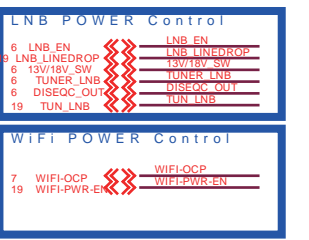
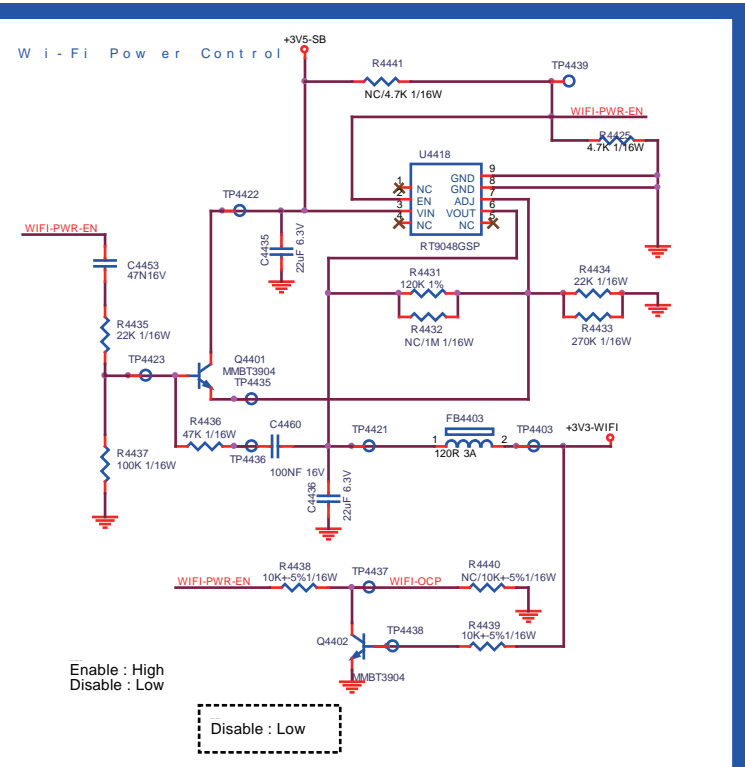
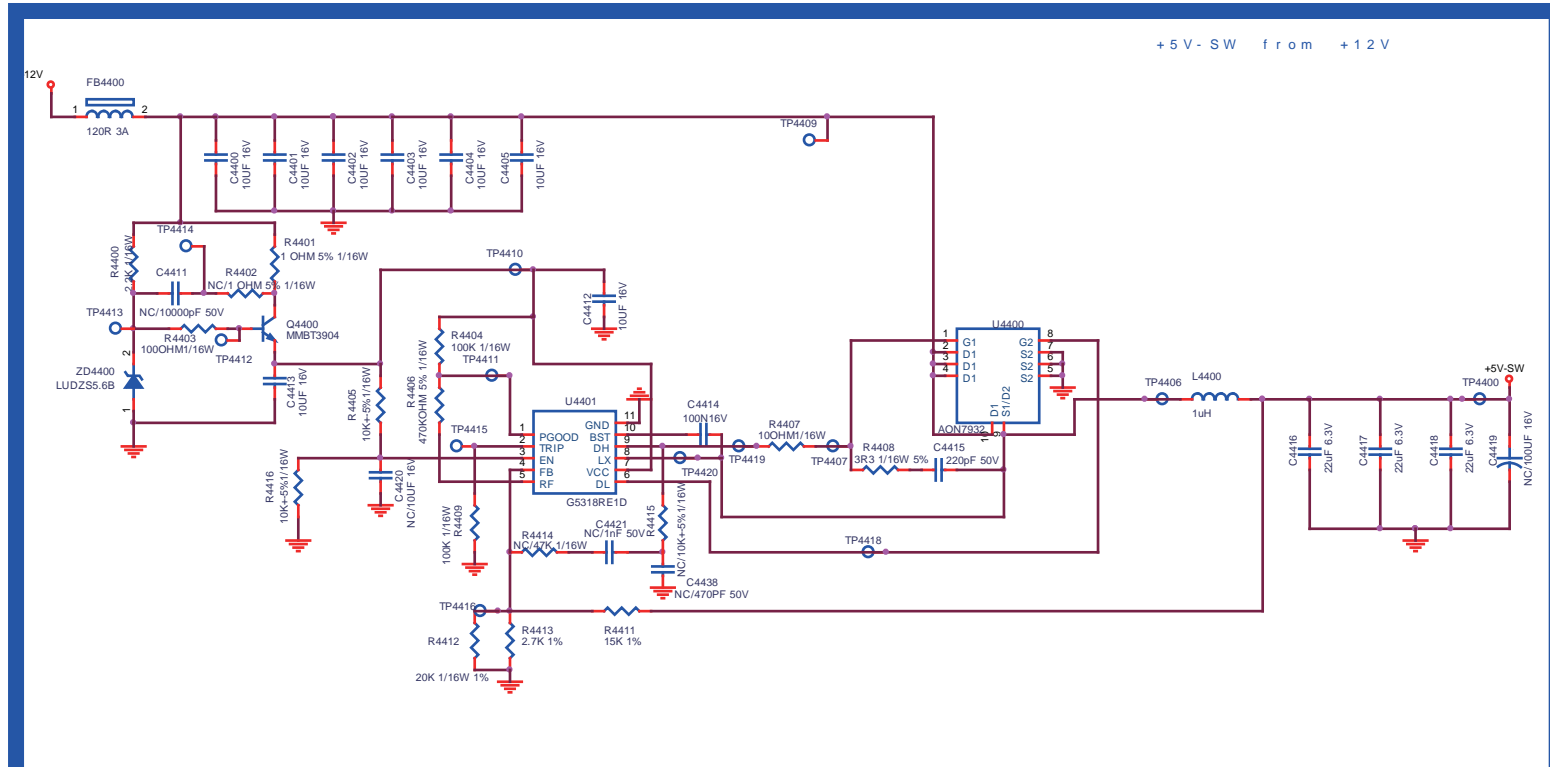
6.19	BL-I-CTRL	BL-I-CTRL
7	SOC-BL-ON	SOC-BL-ON
8	NT-BL-ON	NT-BL-ON
8.9	BL-DIM	BL-DIM

17.19	12V-DETECT	12V-DETECT
19	POWER-OK	POWER-OK
8.8.16	NT-LCD-PWR-ON	NT-LCD-PWR-ON
2	STANDBY	STANDBY
19	DDR-PWR-EN	DDR-PWR-EN
18	POWER-ON	POWER-ON

10-10-15 DCDC-SYSTEM-POWER2

B15 DCDC-SYSTEM-POWER2

B15

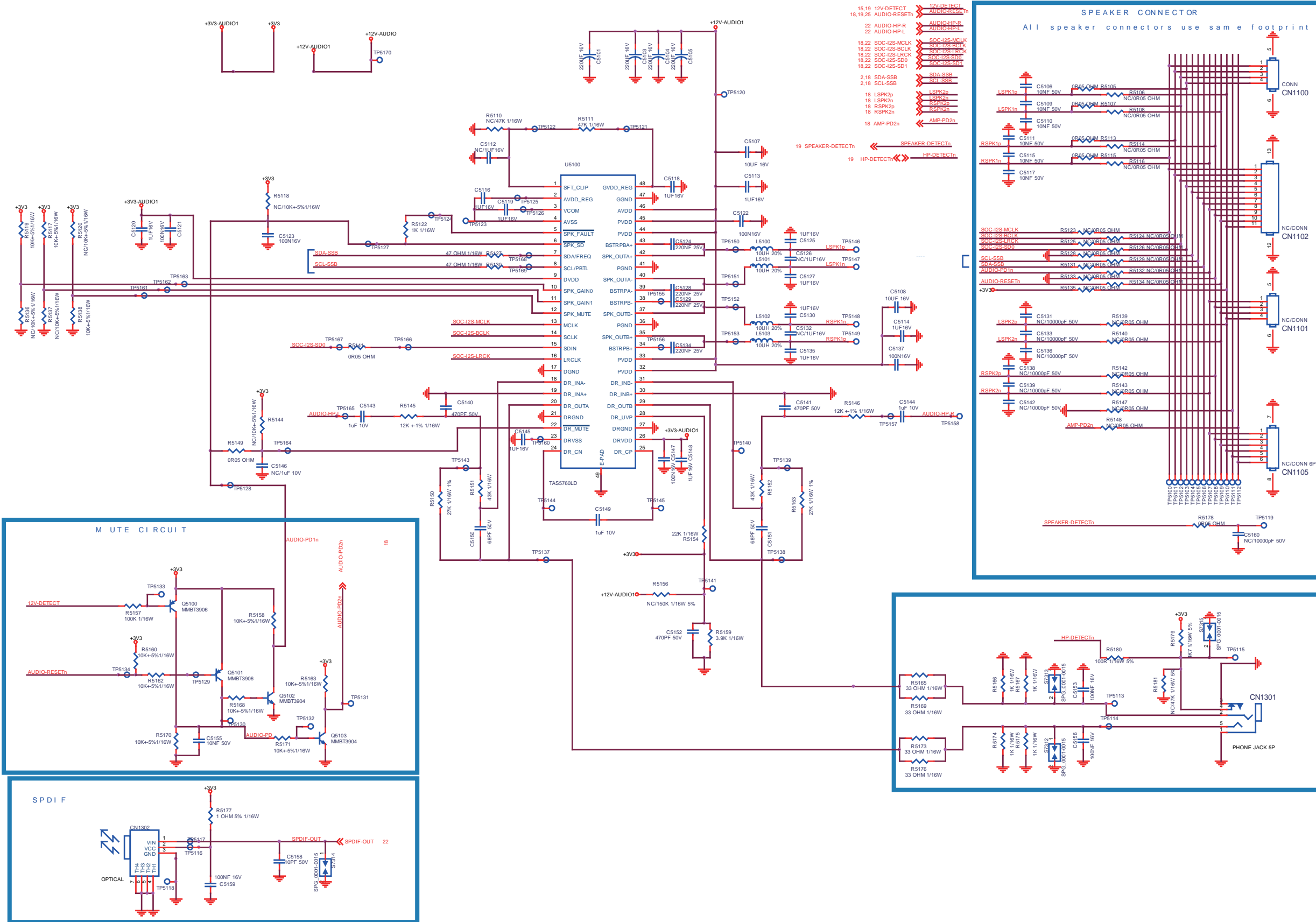


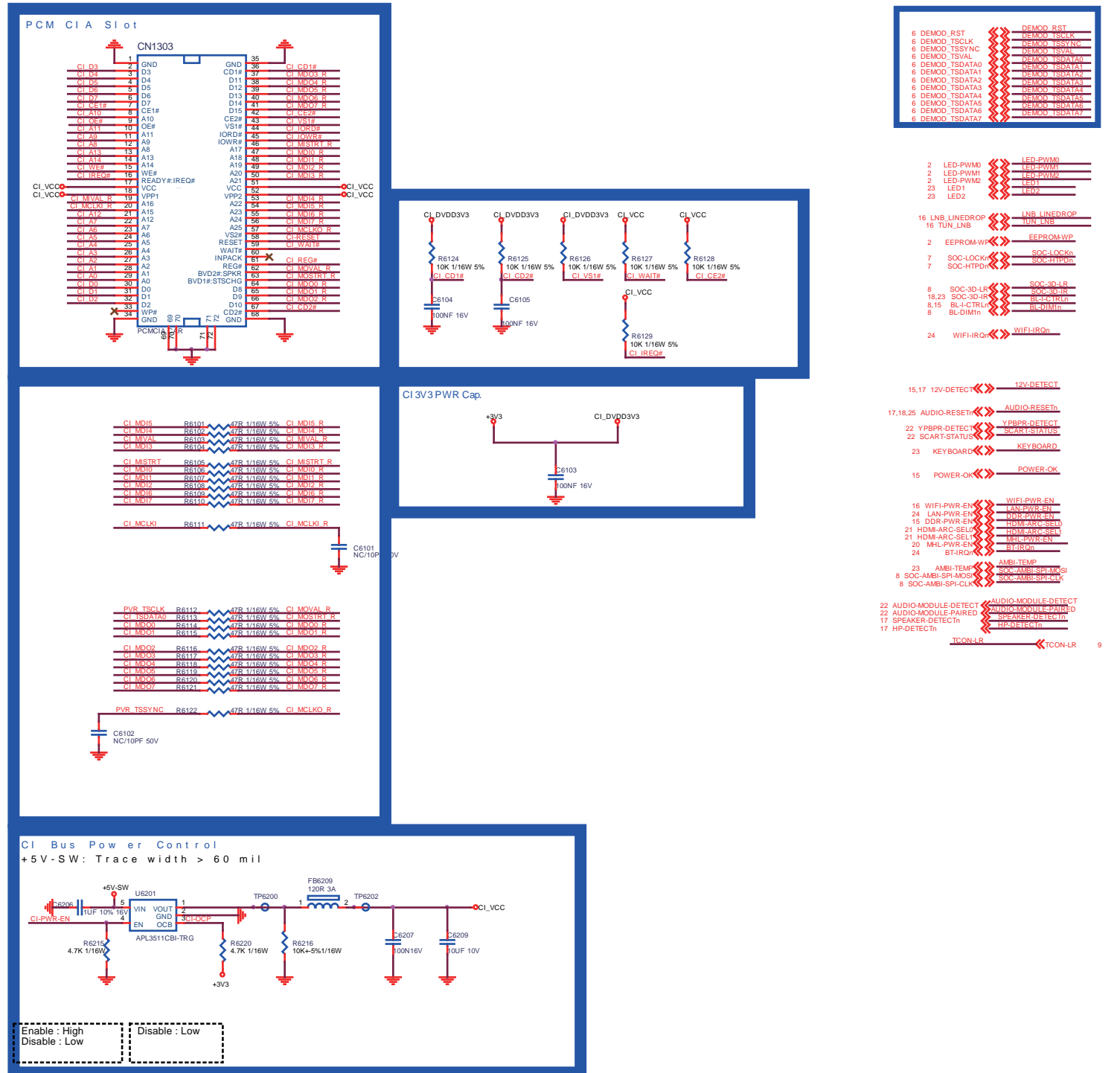
C4457	X	X
C4458	X	X
C4459	X	X
C4460	NA	X
C4461	NA	X
C4462	NA	X
C4463	NA	X
C4464	NA	X
C4465	NA	X
C4466	NA	X
C4467	NA	X
C4468	NA	X
C4469	NA	X
C4470	NA	X
C4471	NA	X
C4472	NA	X

B16

AUDIO-1st-CLASS-D-AMP

B16

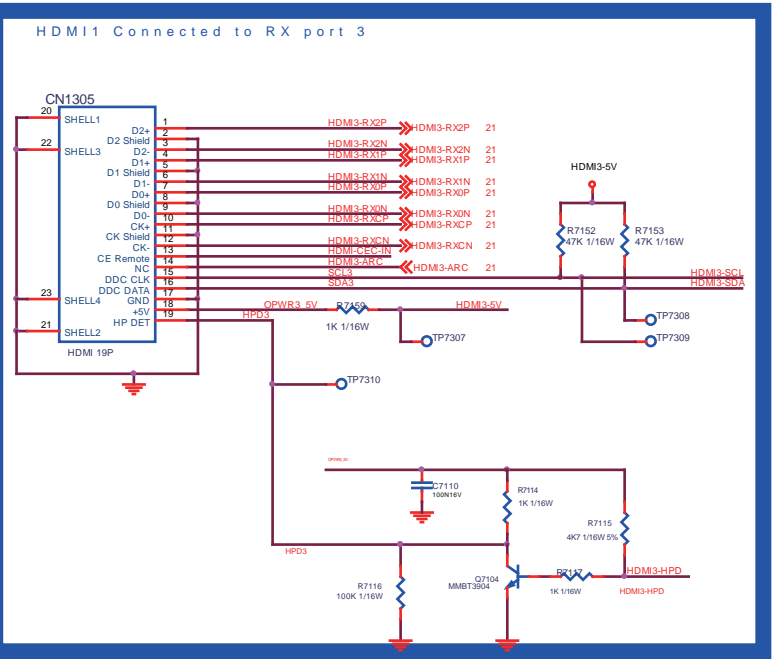
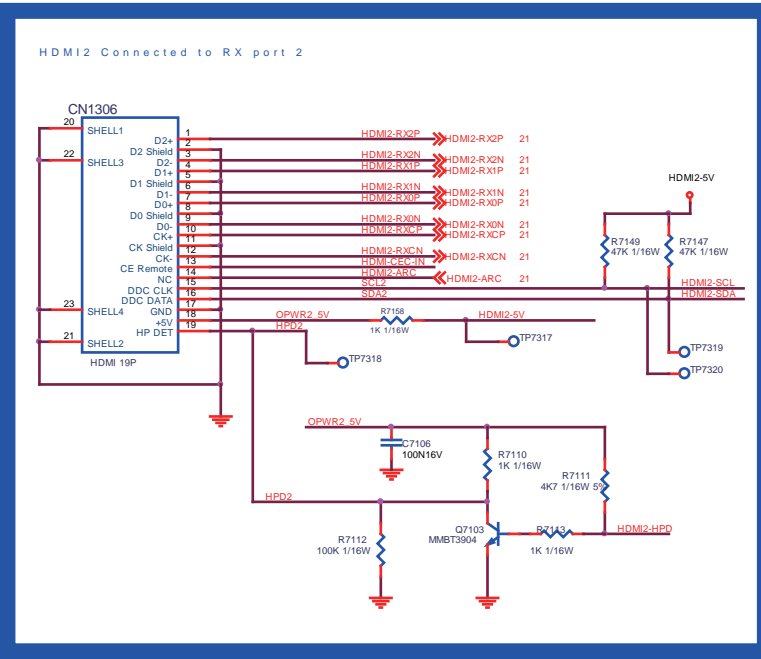
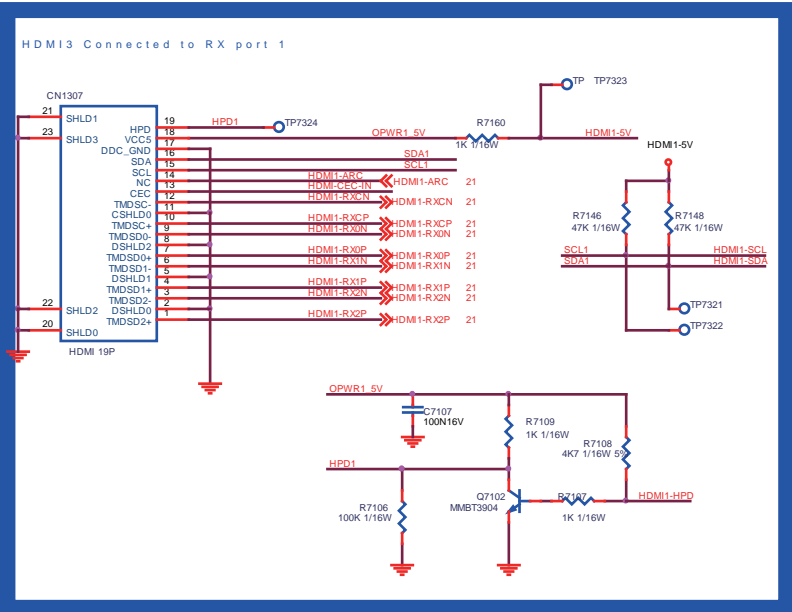
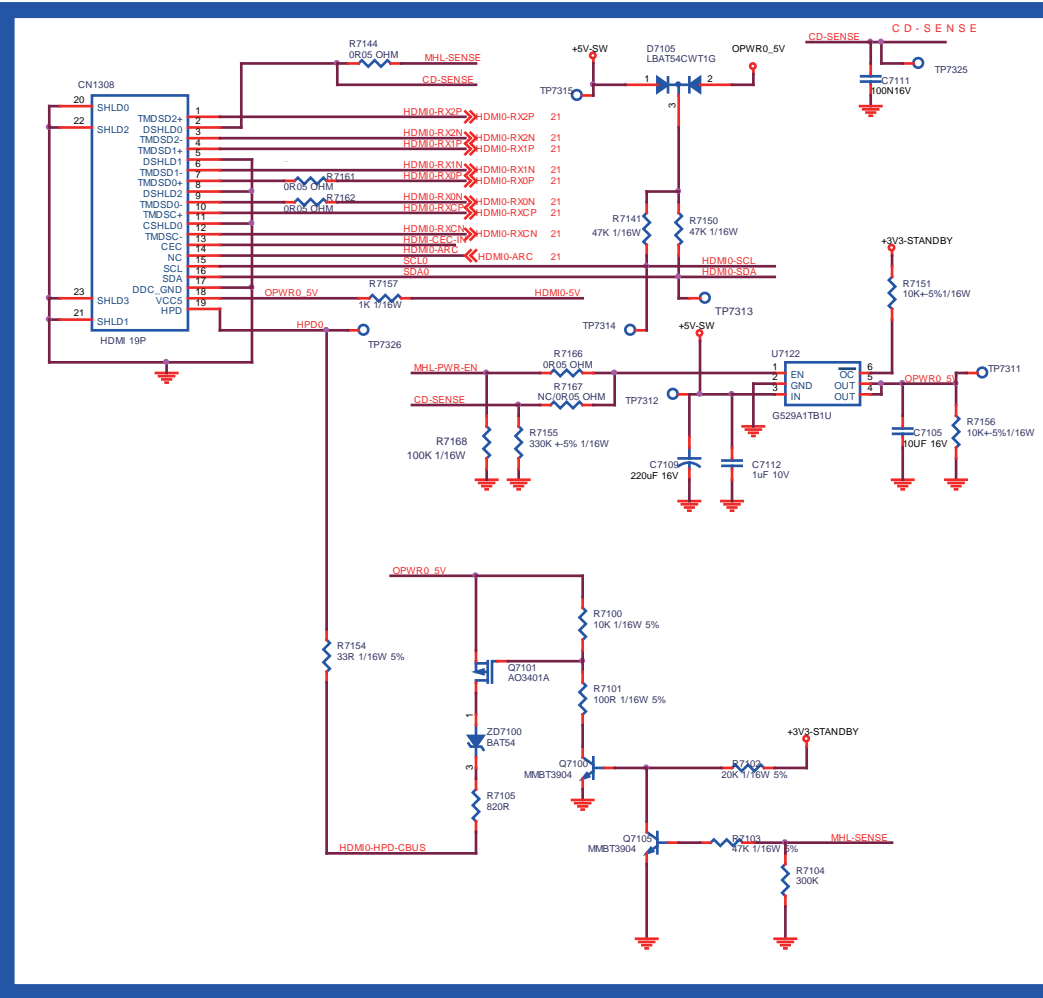




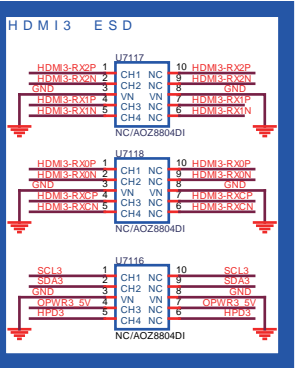
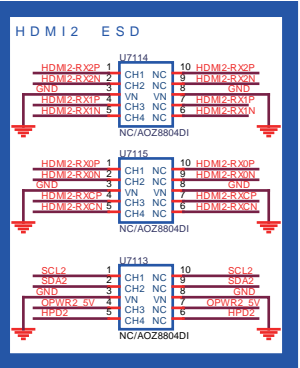
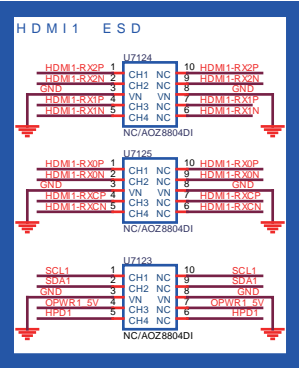
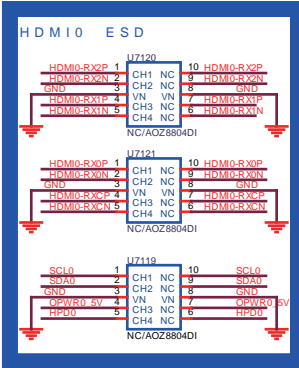
B19

HDMI-INPUTS

B19



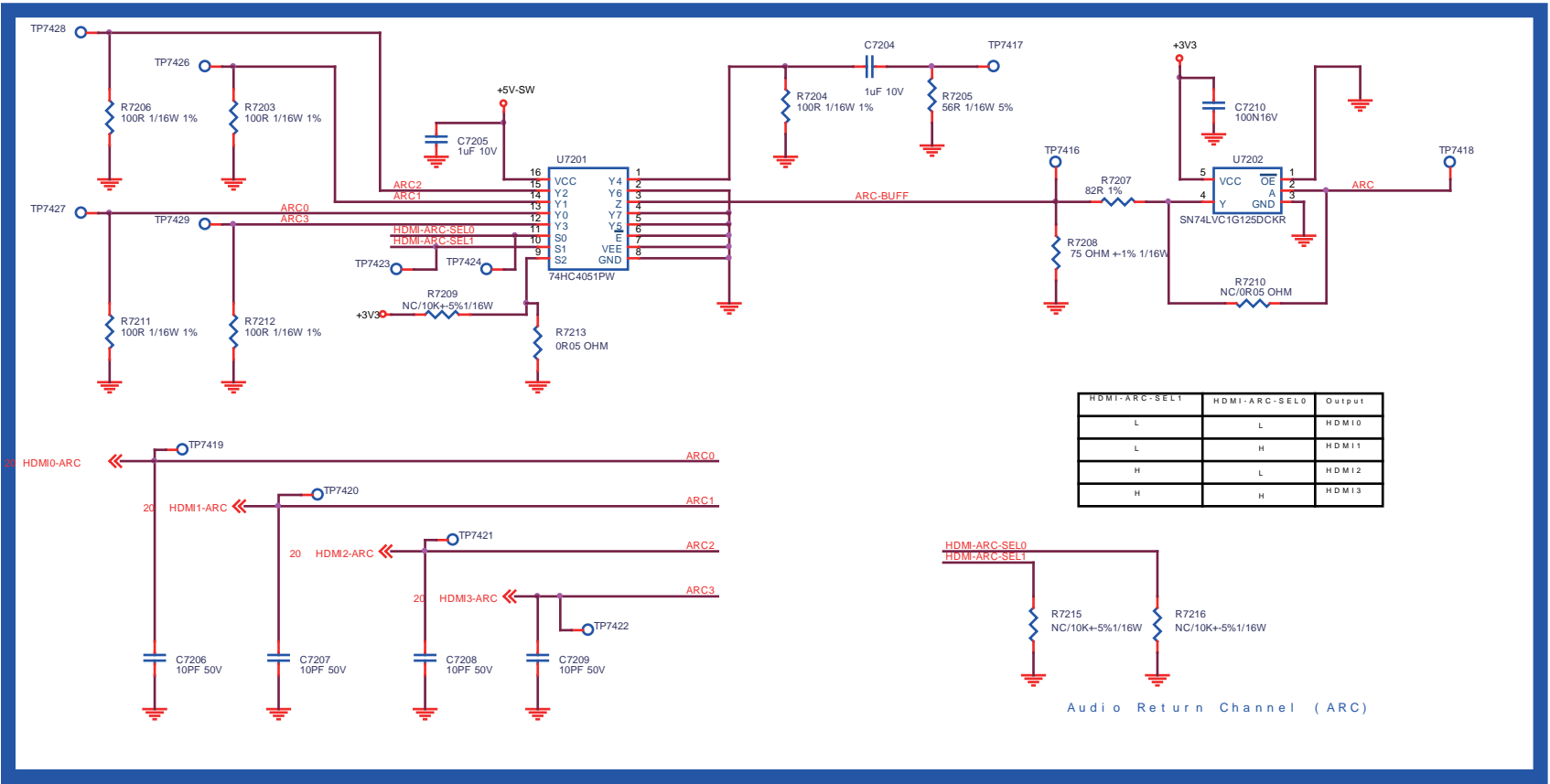
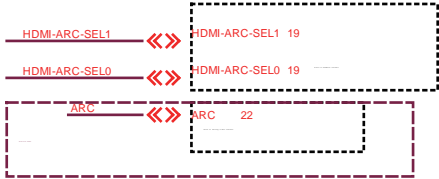
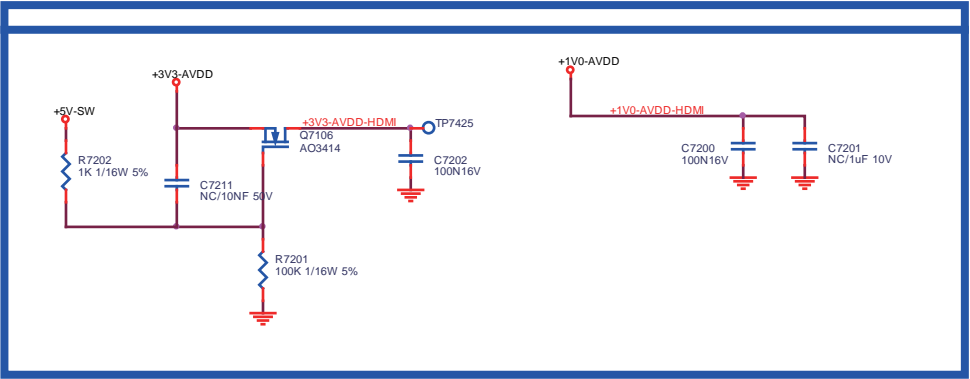
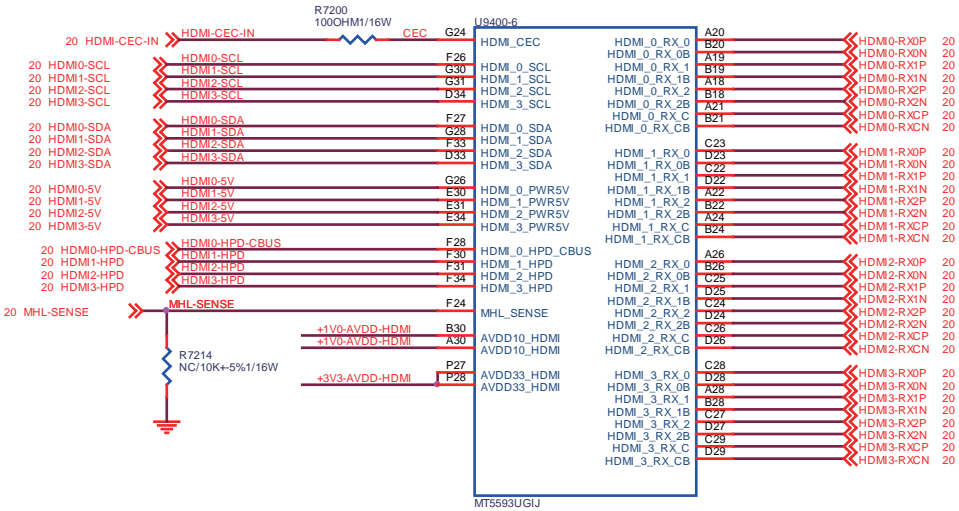
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- HDMI1-SCL <>> HDMI1-SCL 21
- HDMI2-SCL <>> HDMI2-SCL 21
- HDMI3-SCL <>> HDMI3-SCL 21
- HDMI0-SDA <>> HDMI0-SDA 21
- HDMI1-SDA <>> HDMI1-SDA 21
- HDMI2-SDA <>> HDMI2-SDA 21
- HDMI3-SDA <>> HDMI3-SDA 21
- HDMI0-HPD-CBUS <>> HDMI0-HPD-CBUS 21
- HDMI1-HPD <>> HDMI1-HPD 21
- HDMI2-HPD <>> HDMI2-HPD 21
- HDMI3-HPD <>> HDMI3-HPD 21
- MHL-PWR-EN <>> MHL-PWR-EN 19
- HDMI-CEC-IN <>> HDMI-CEC-IN 21
- MHL-SENSE <>> MHL-SENSE 21
- HDMI0-5V <>> HDMI0-5V 21
- HDMI1-5V <>> HDMI1-5V 21
- HDMI2-5V <>> HDMI2-5V 21
- HDMI3-5V <>> HDMI3-5V 21



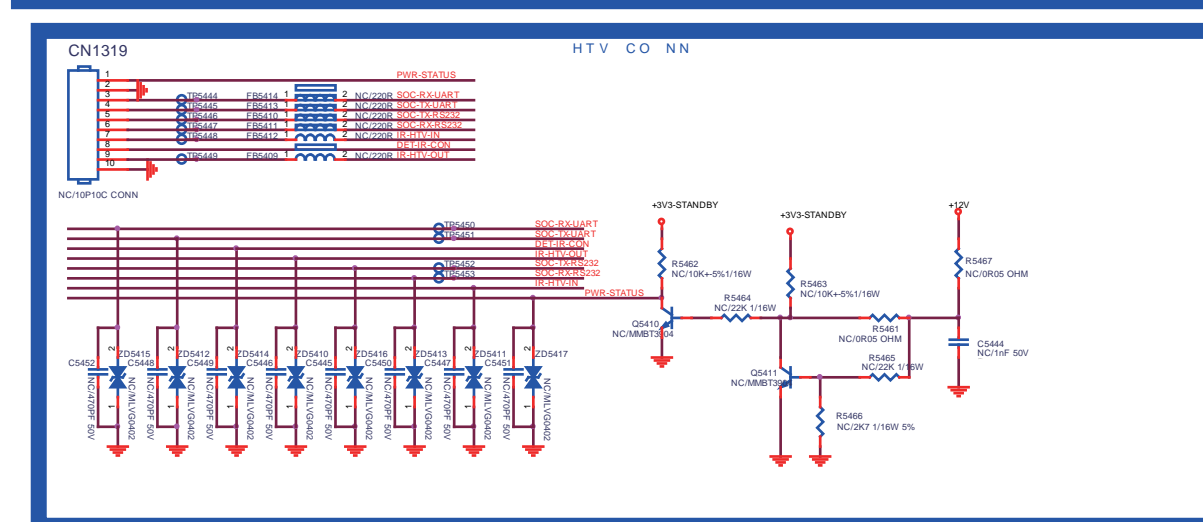
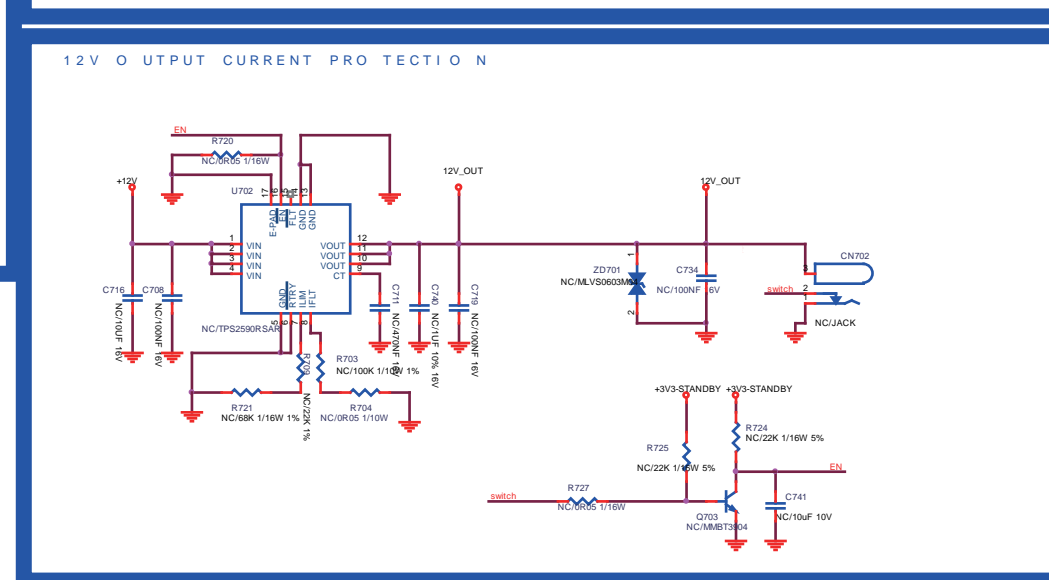
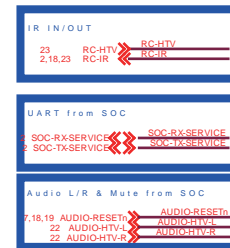
10-10-20 HDMI-SOC-ARC

B20 HDMI-SOC-ARC

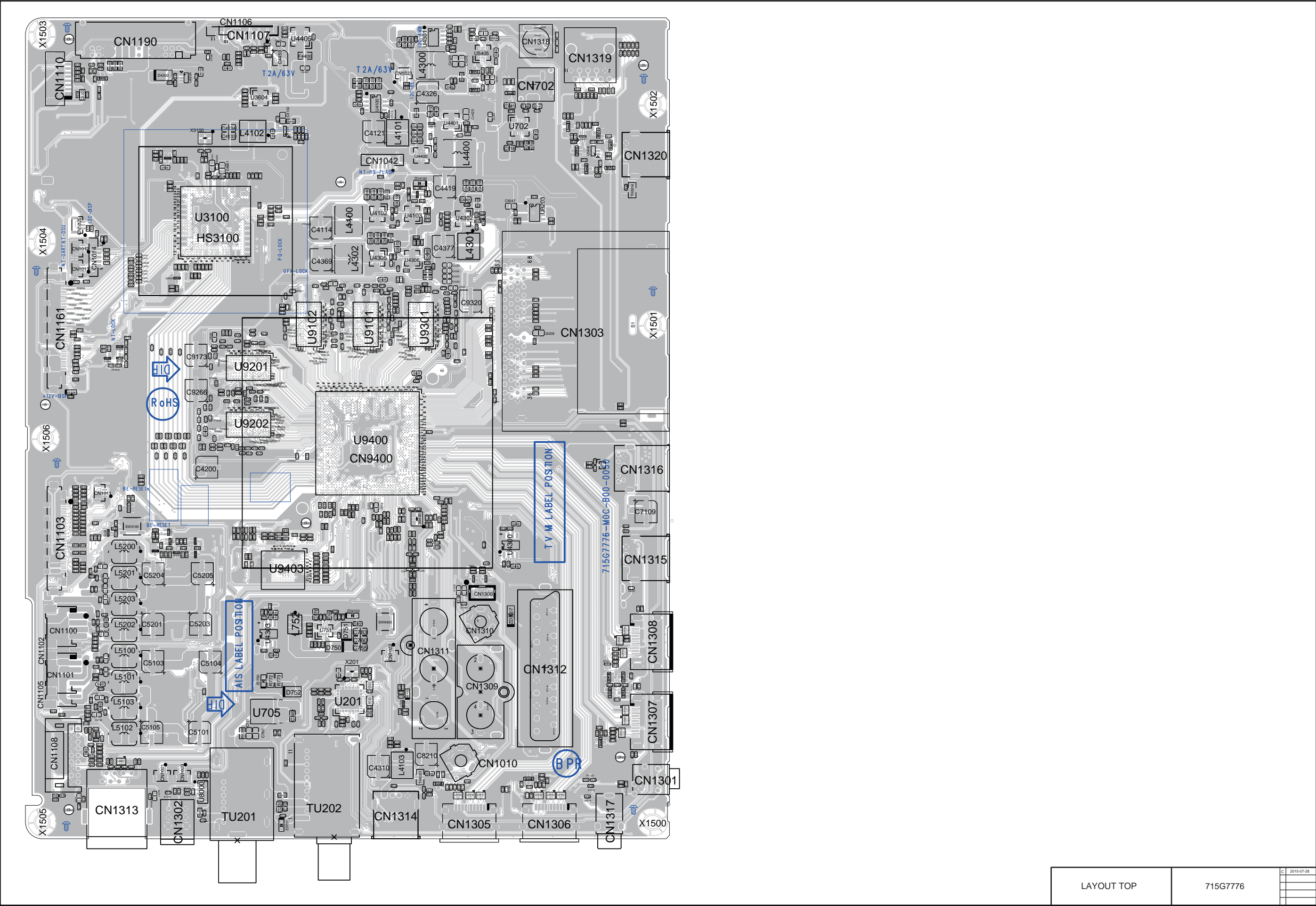
B20



B24

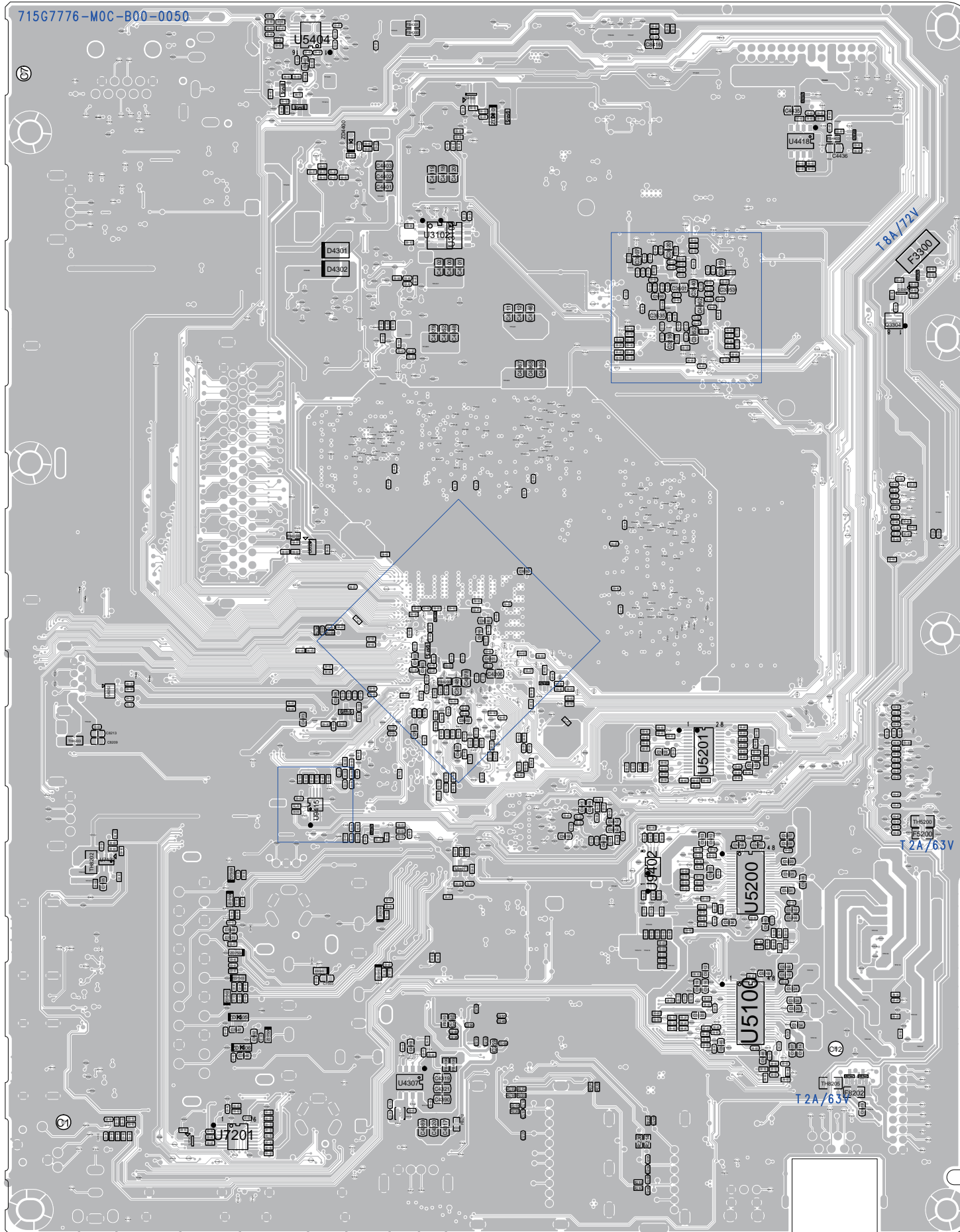


10-10-25 SSB layout top



LAYOUT TOP	715G7776	C 2015-07-28

715G7776-M0C-B00-0050

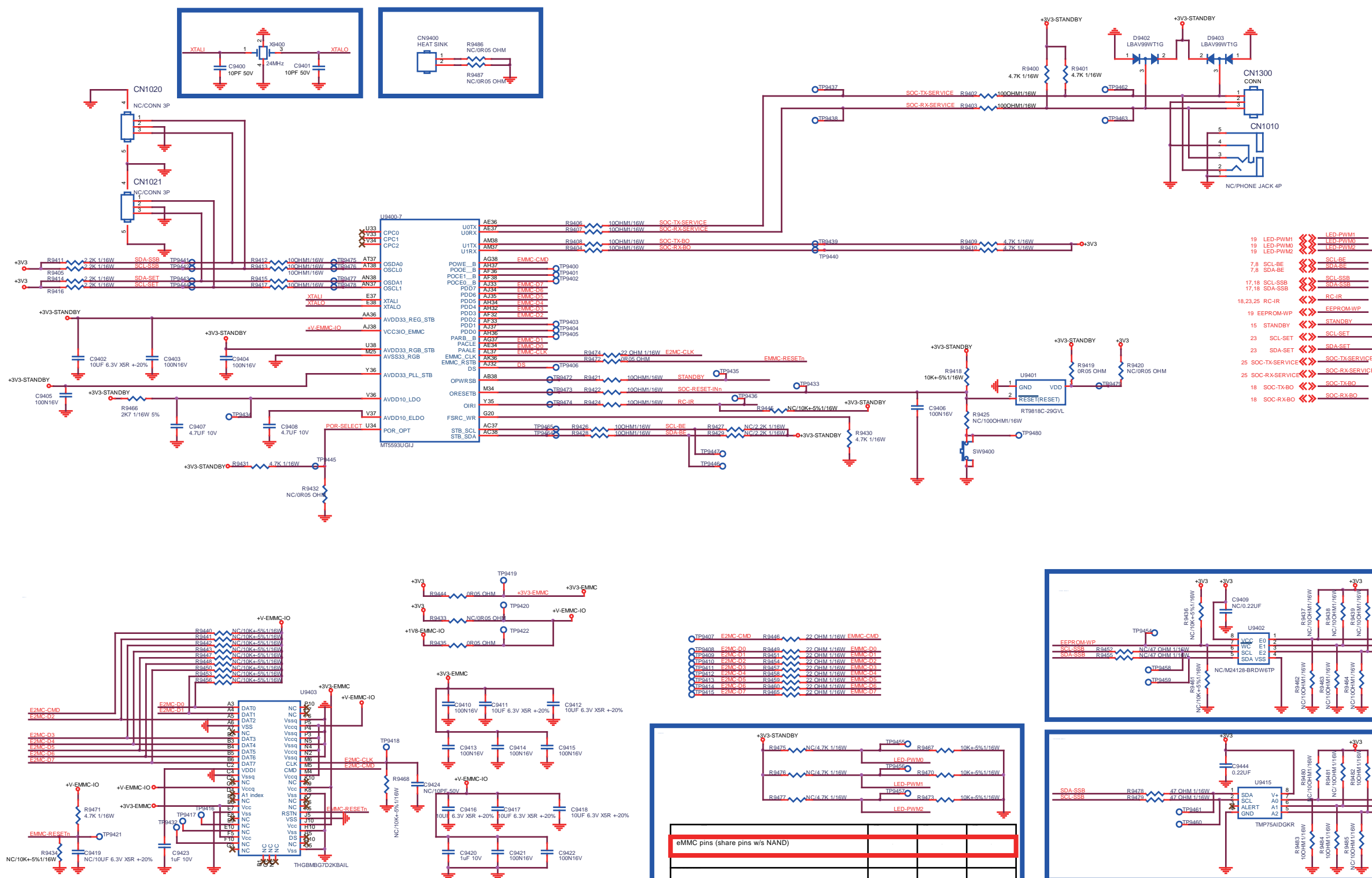


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C	2015-07-28
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B01 SOC-EMMC

B01



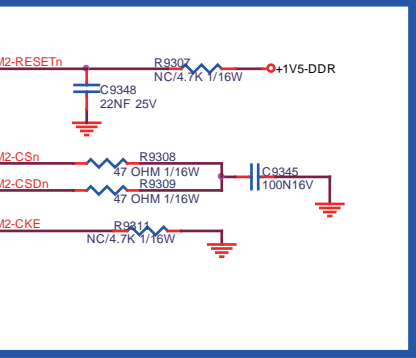
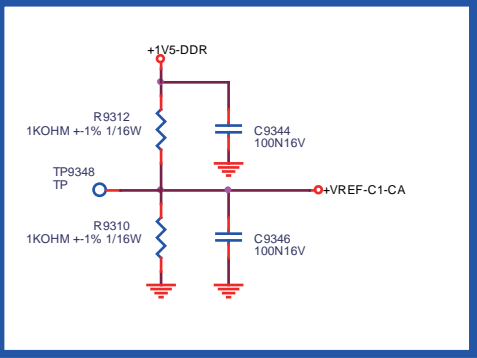
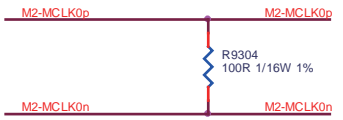
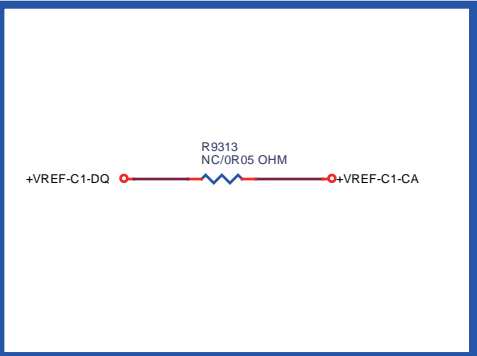
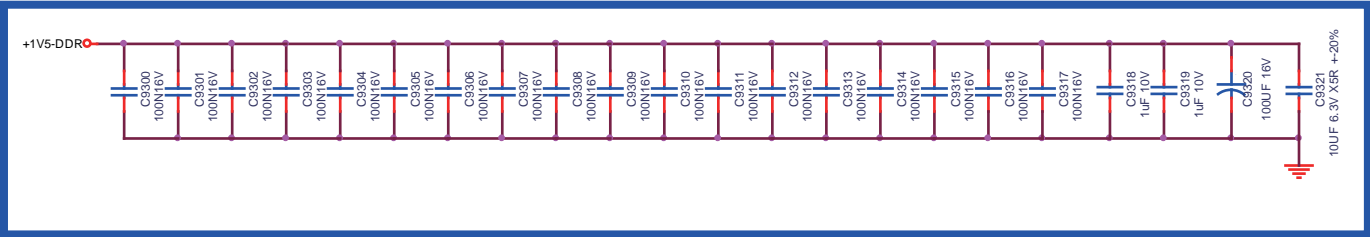
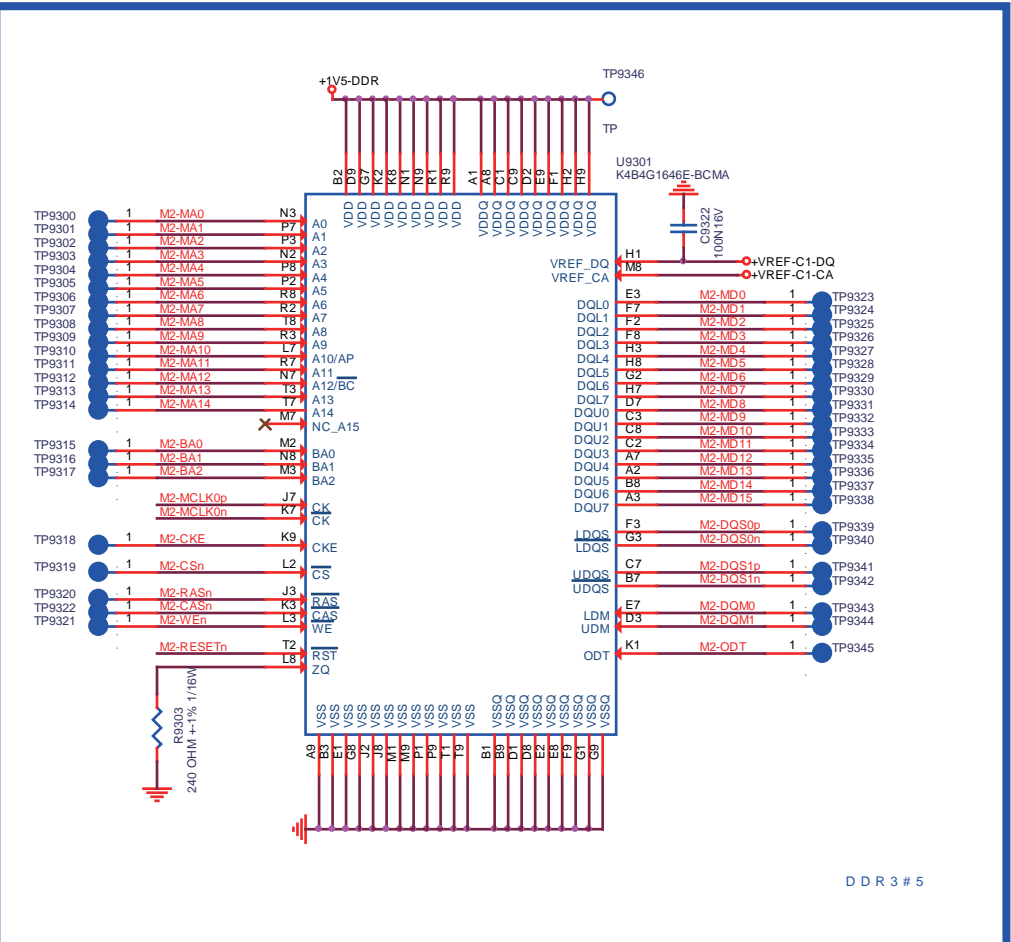
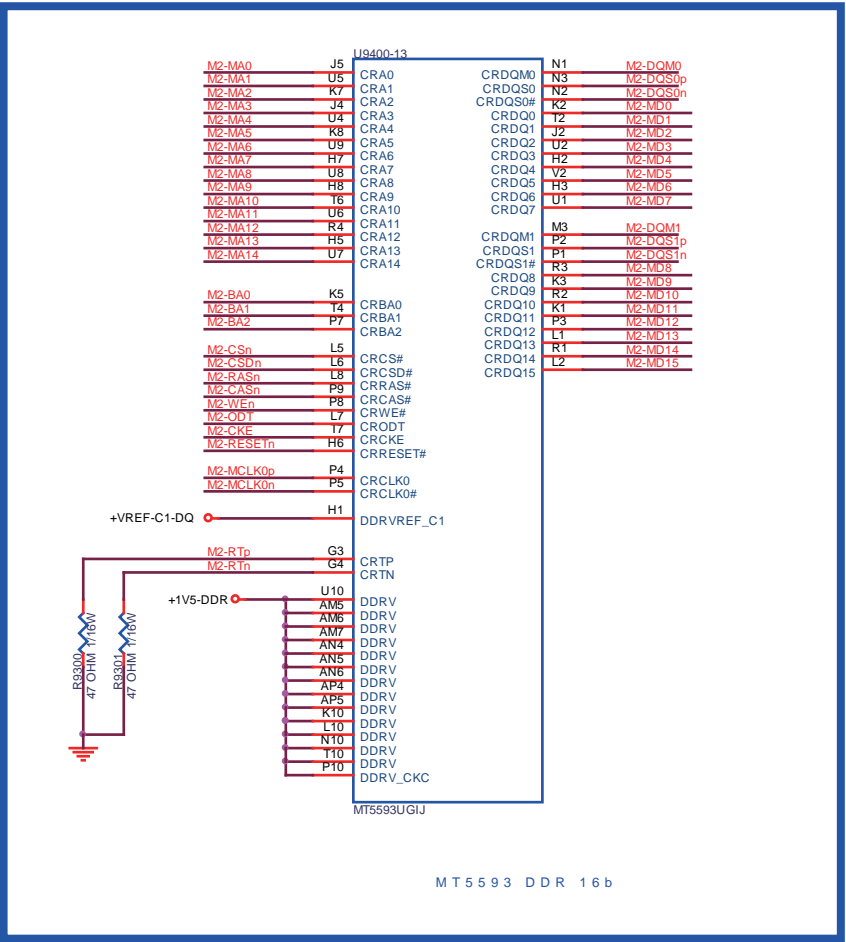
715G7772

20030 512.eps

B04

SOC-DDR3-5

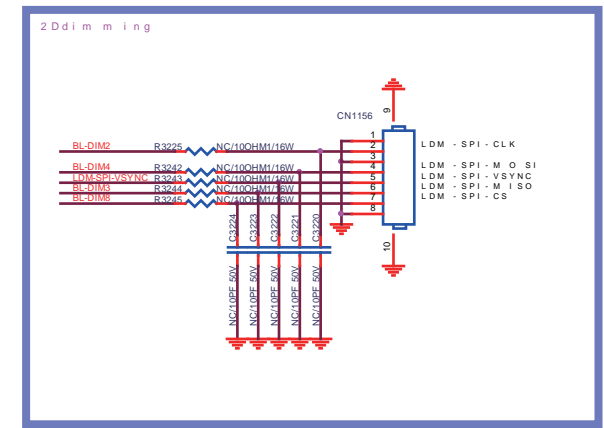
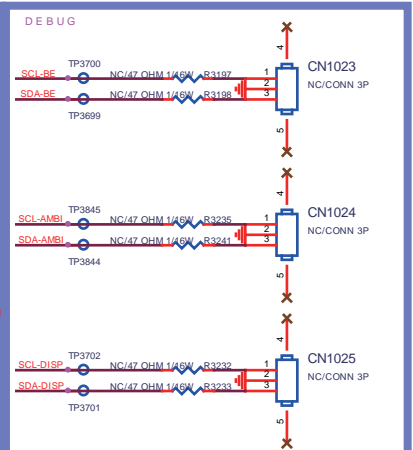
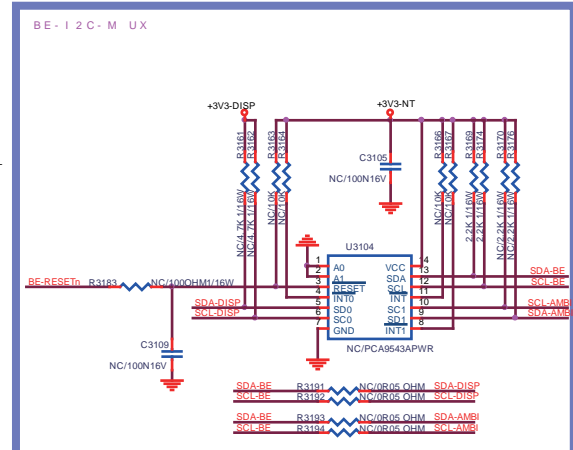
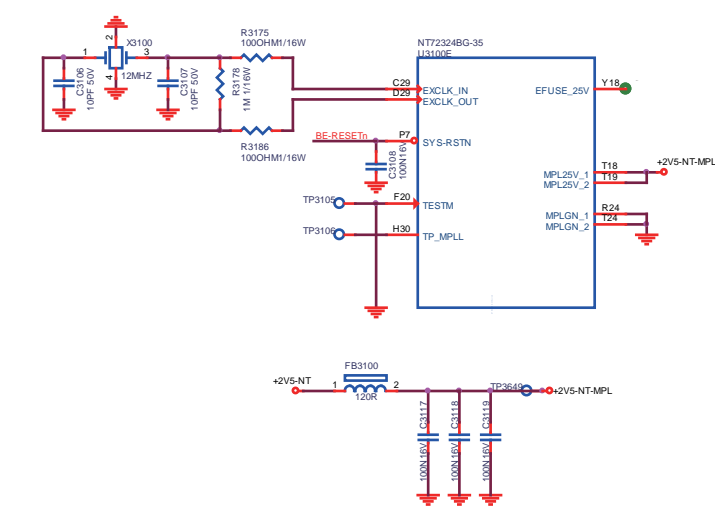
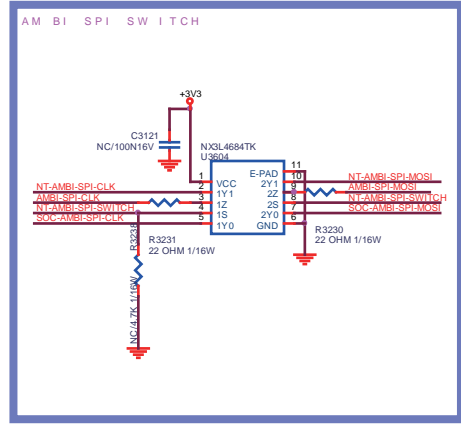
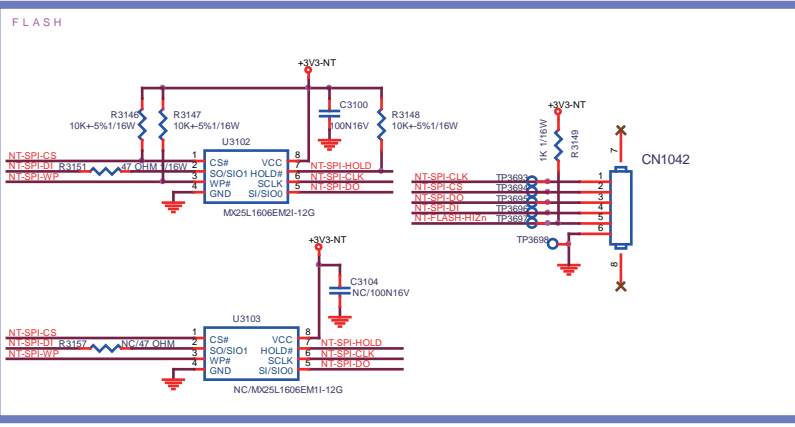
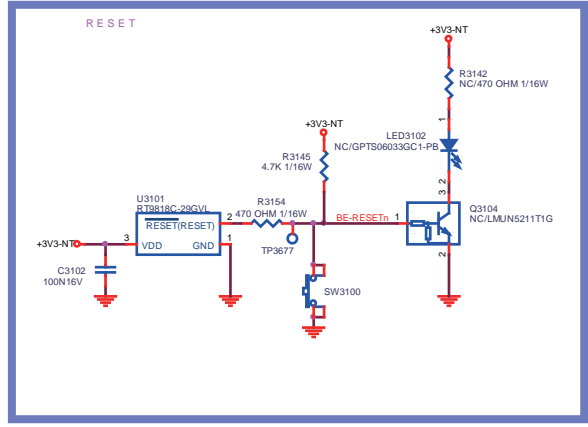
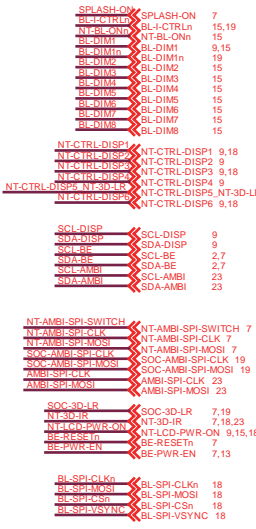
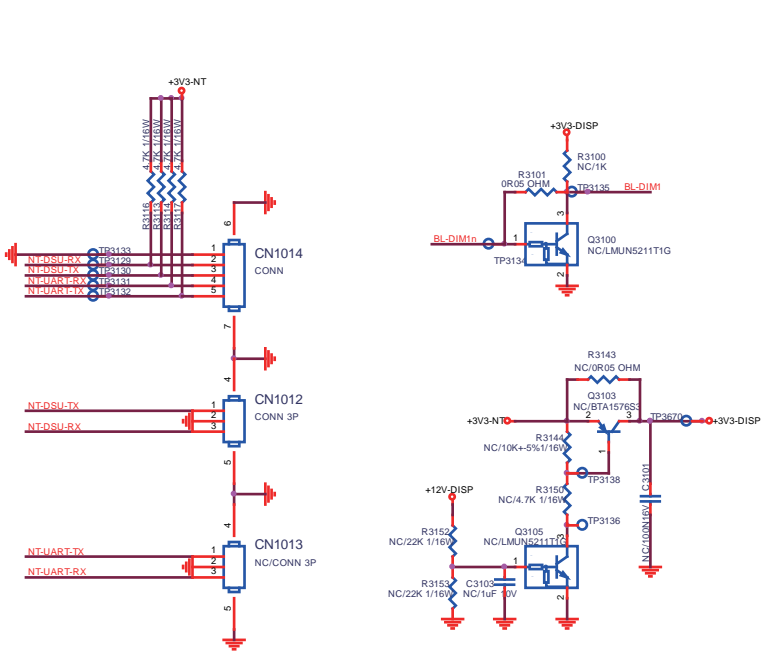
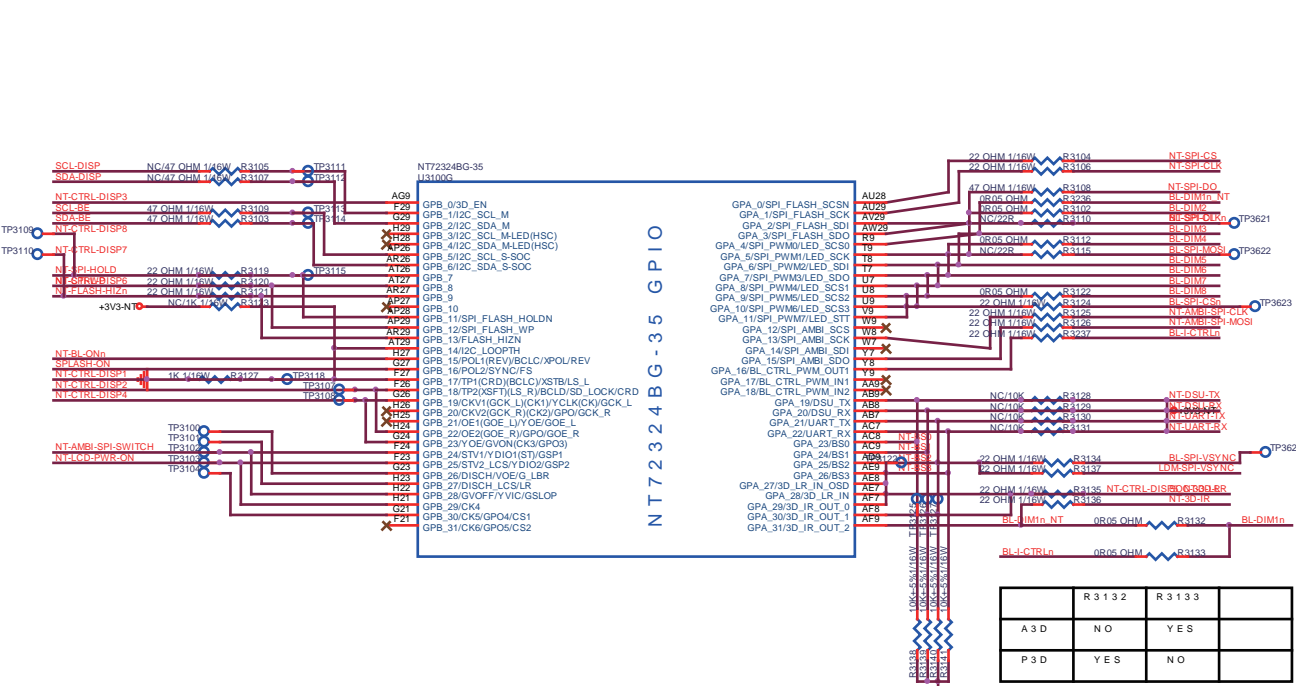
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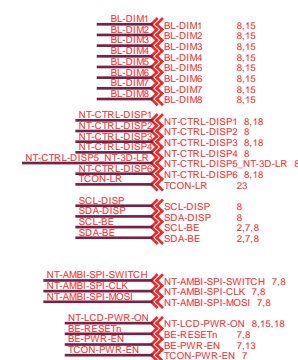
B07

BE-NT324b-GPIO

B07



B08

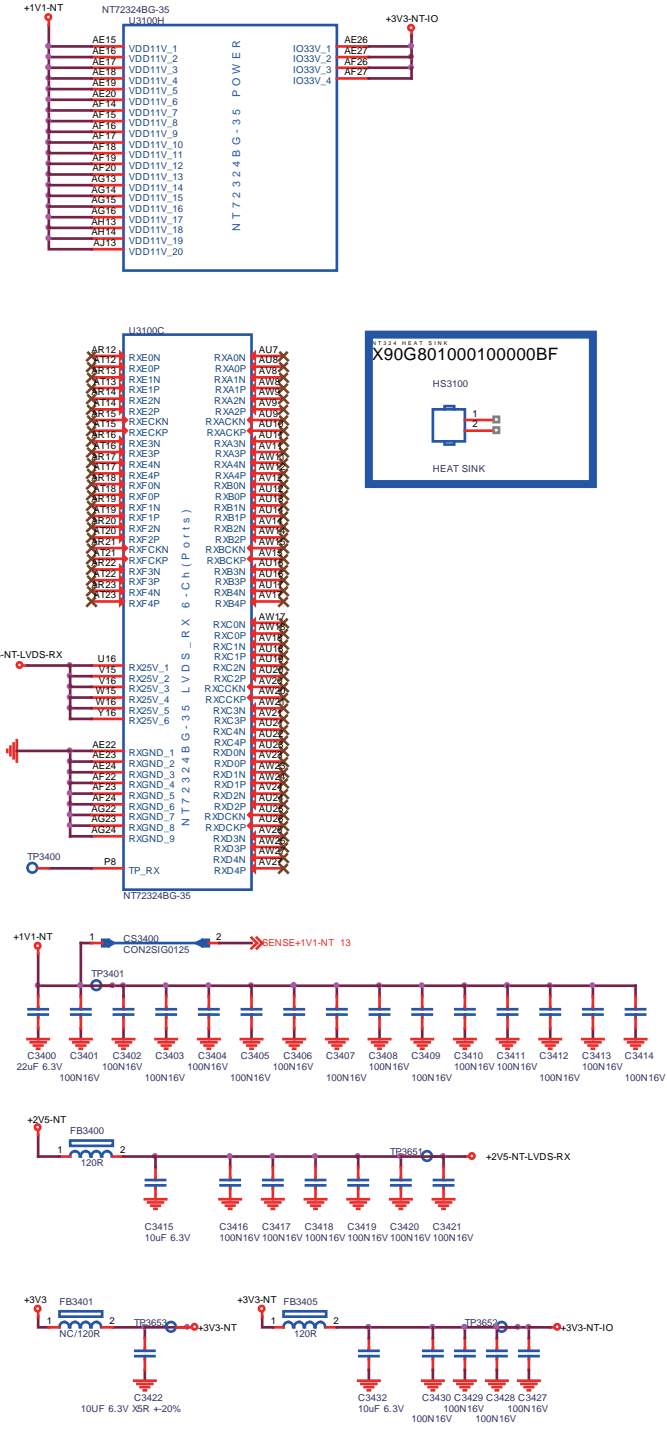
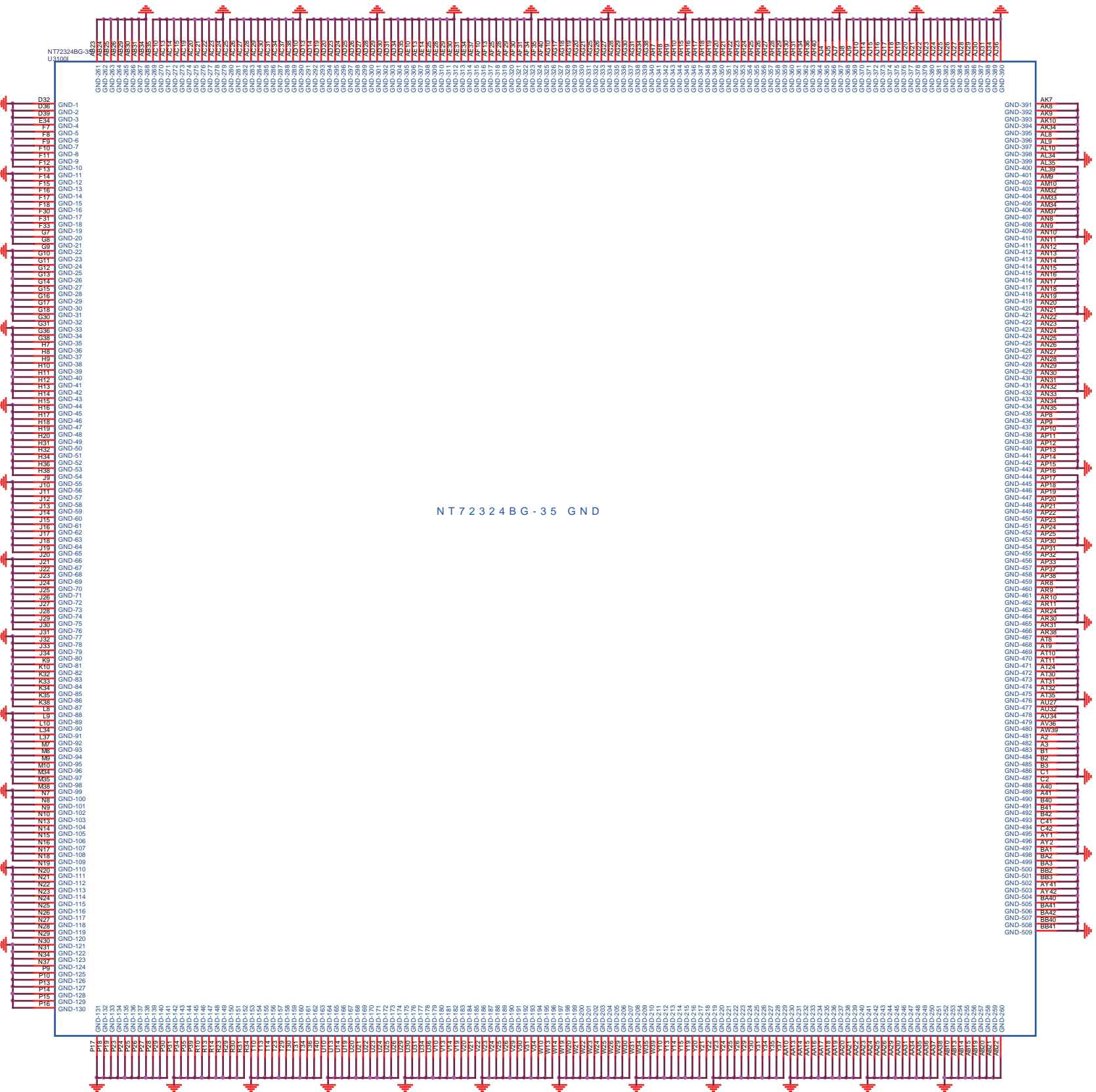


B09

BE-NT324d-POWER

B09

NT 3 2 4 P O W E R



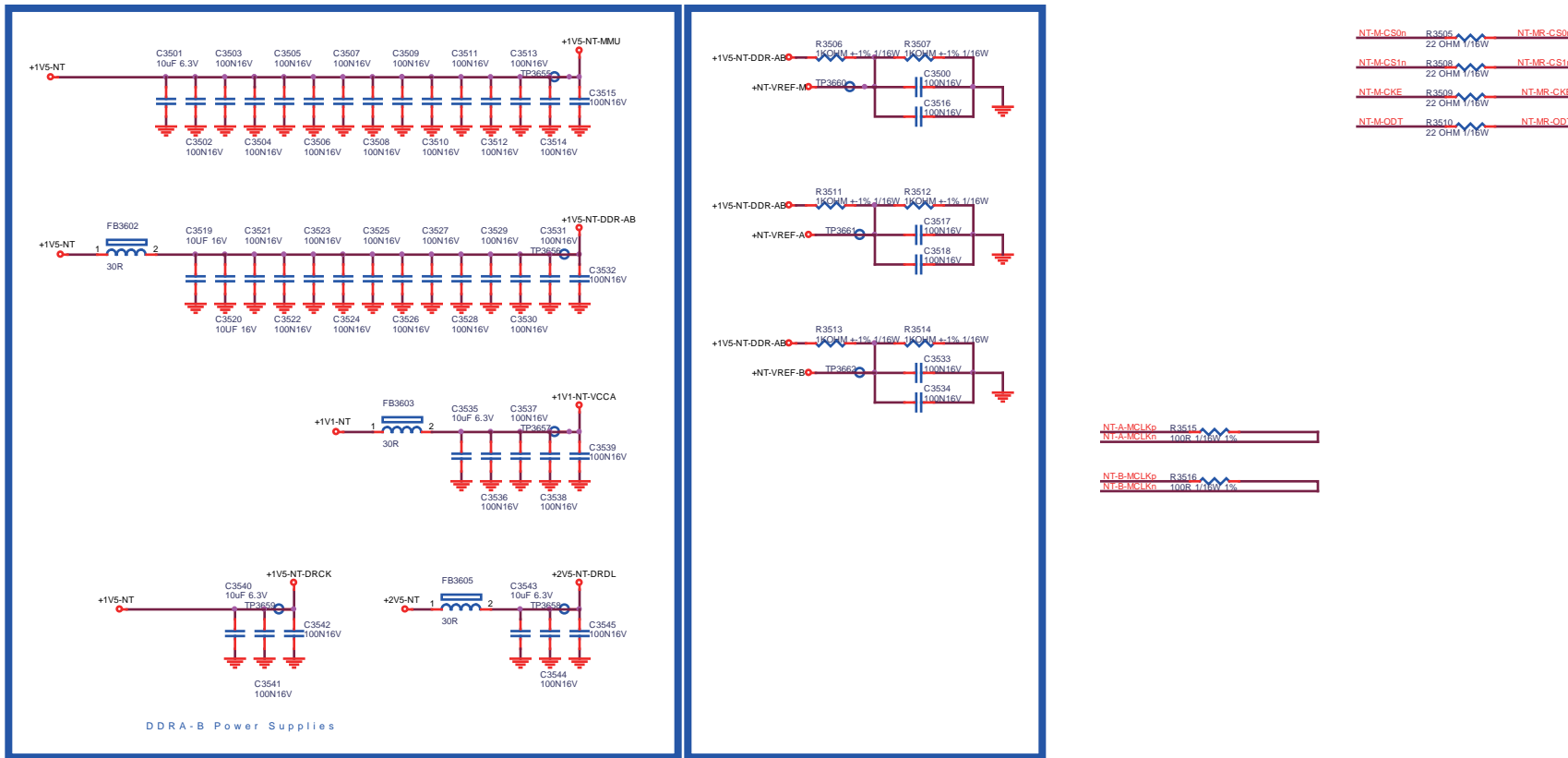
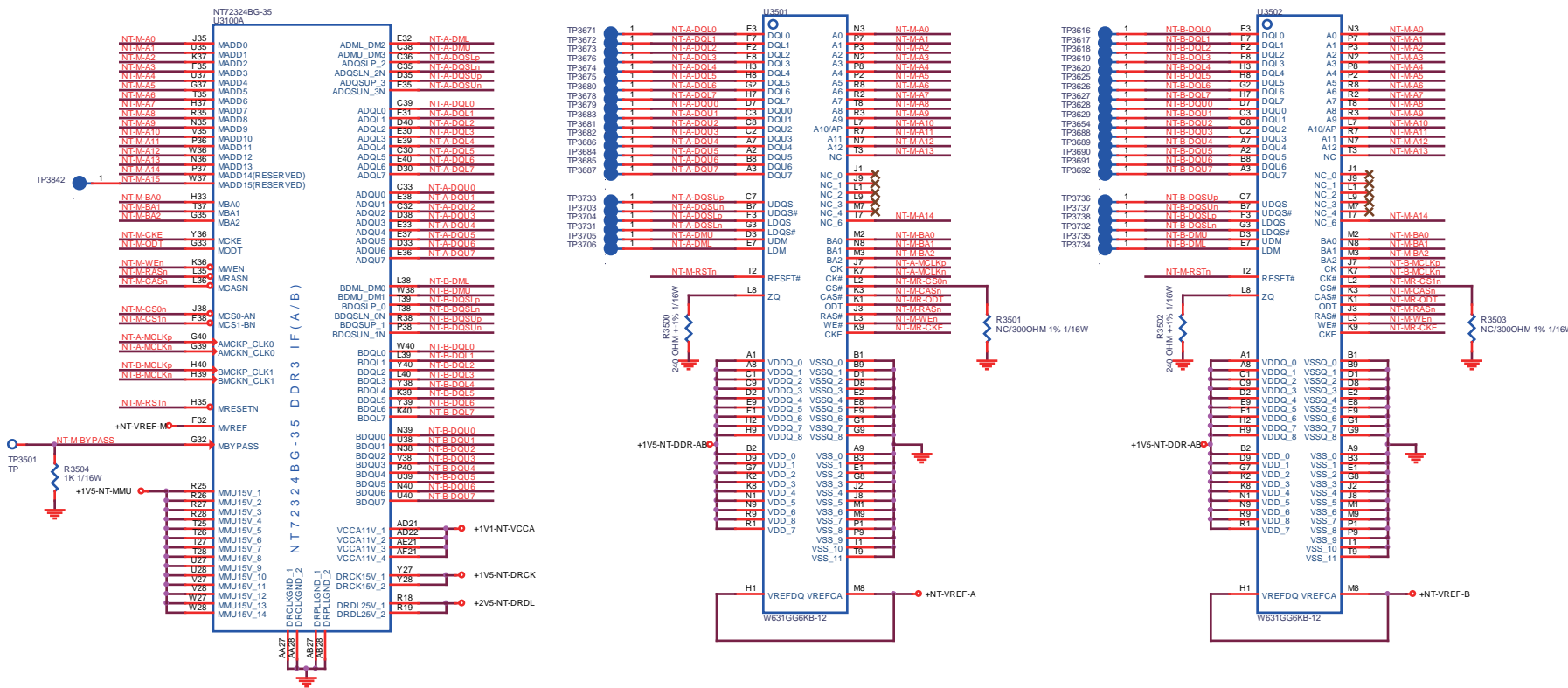
10-11-10 BE-NT324e-DDR

B10

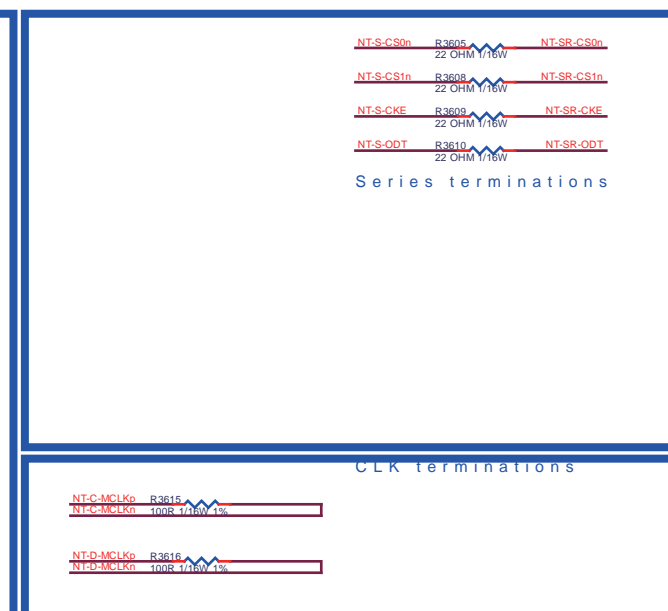
BE-NT324e-DDR

B10

NT324 DDR A-B



B11

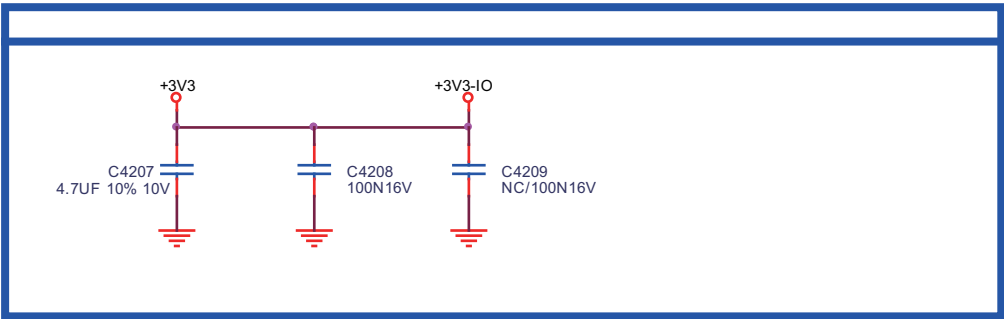
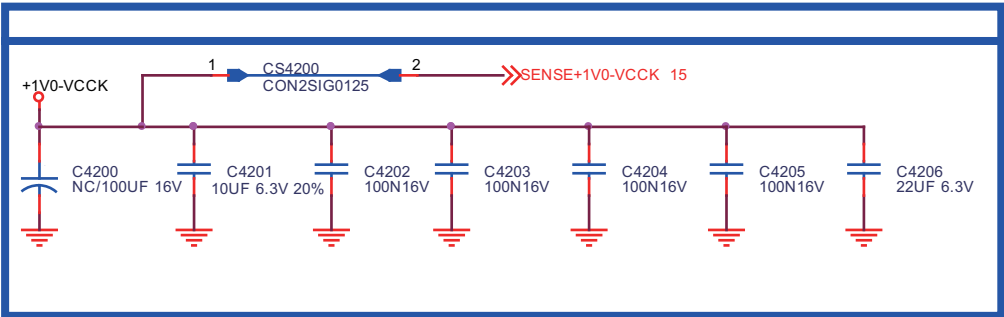
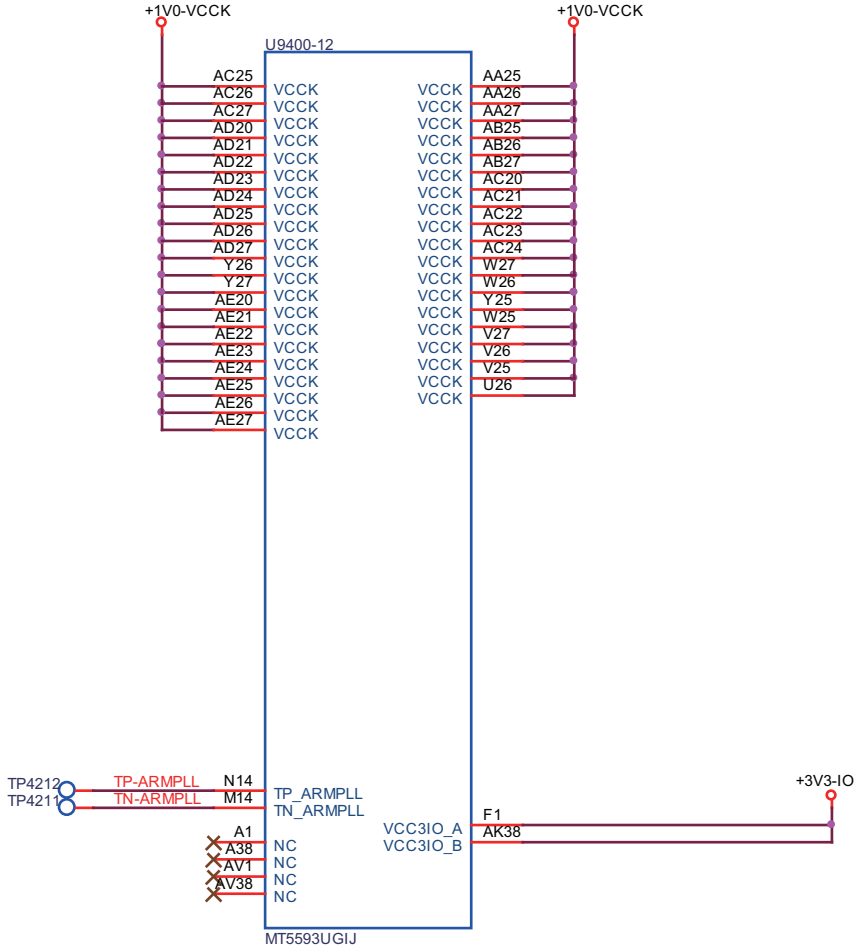
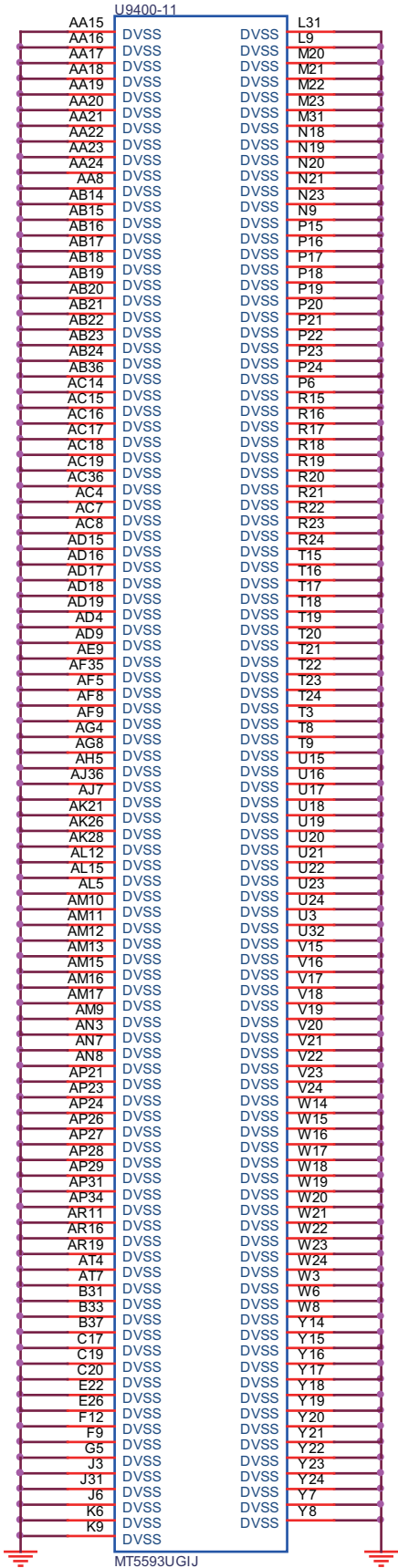


10-11-13 DCDC-SOC-VCCK-DVSS

B13

DCDC-SOC-VCCK-DVSS

B13



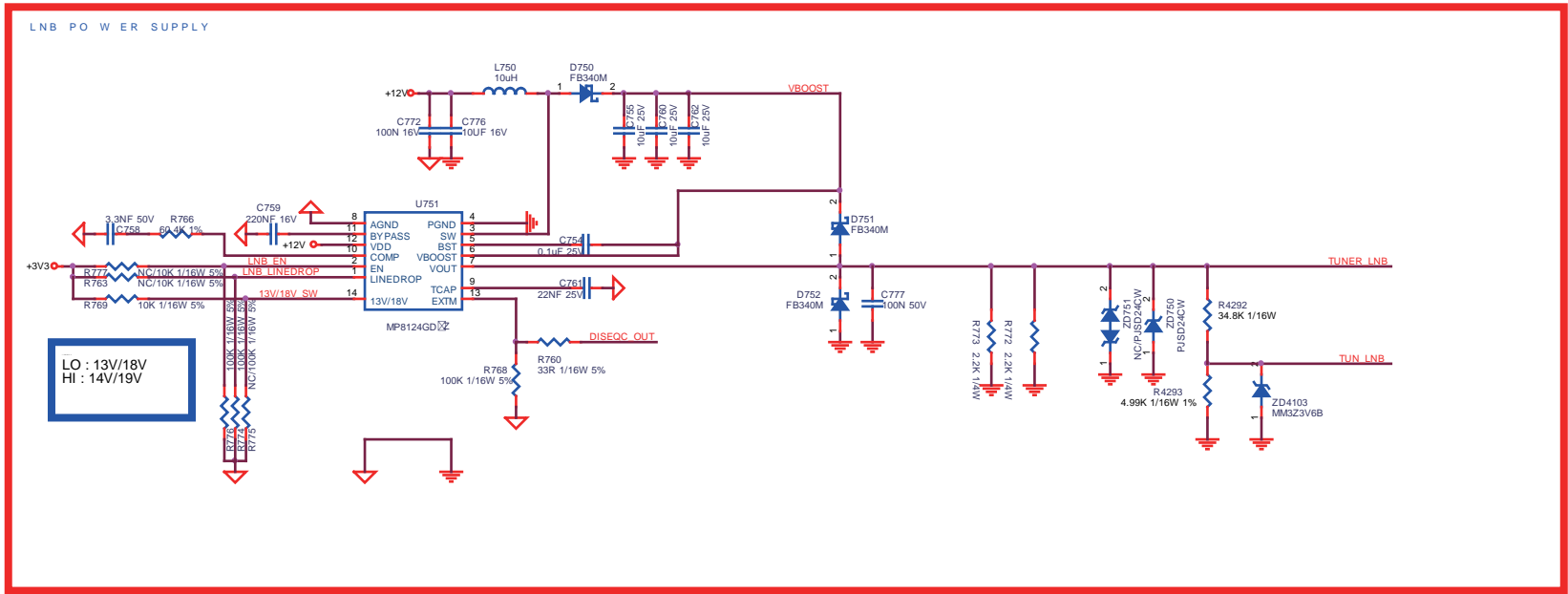
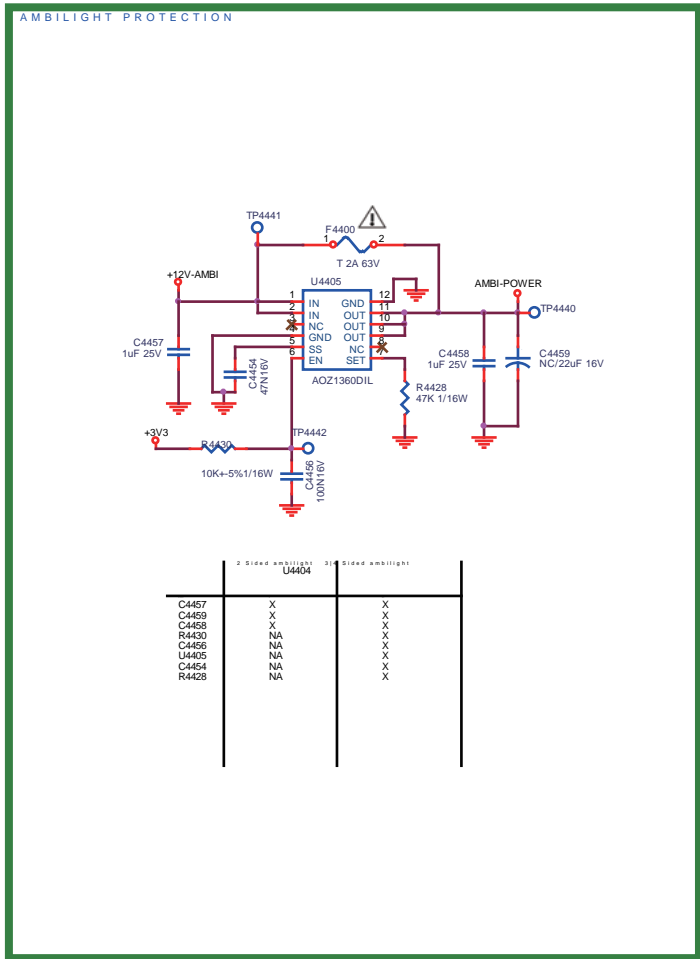
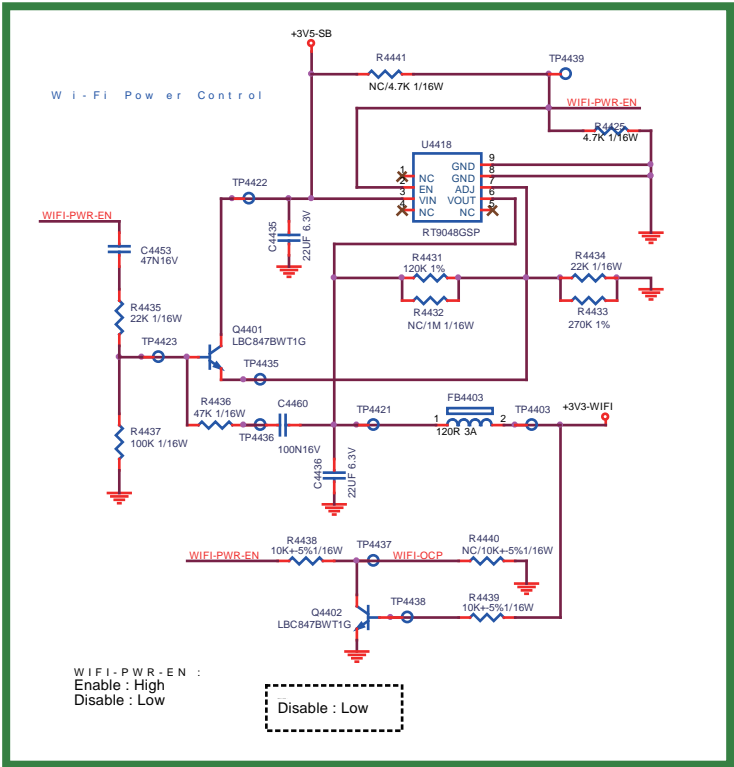
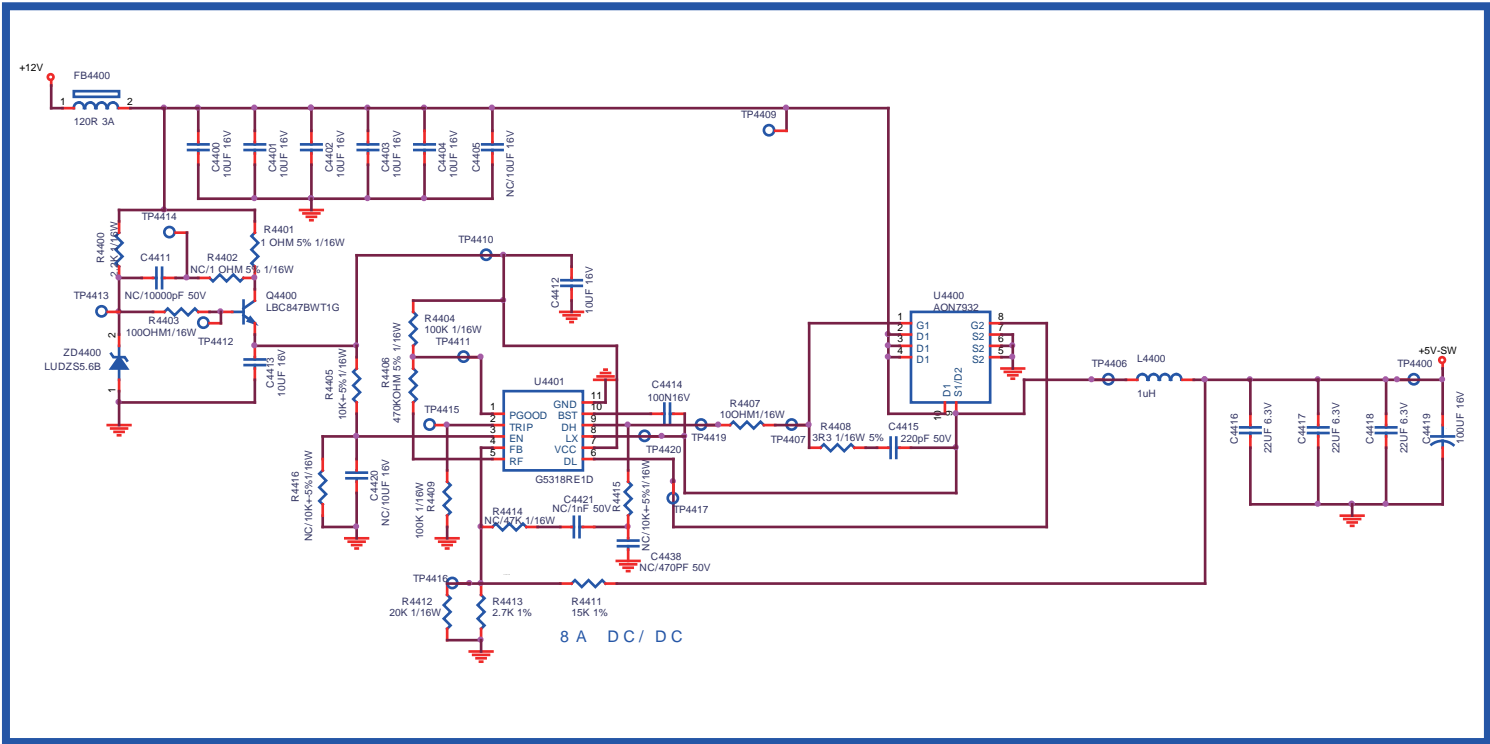
DCDC-SOC-VCCK-DVSS

715G7772

2015.7.6

B15 DCDC-SYSTEM-POWER2

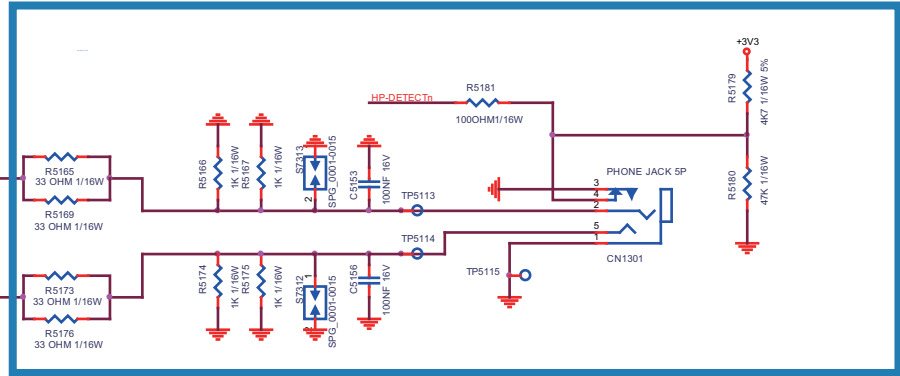
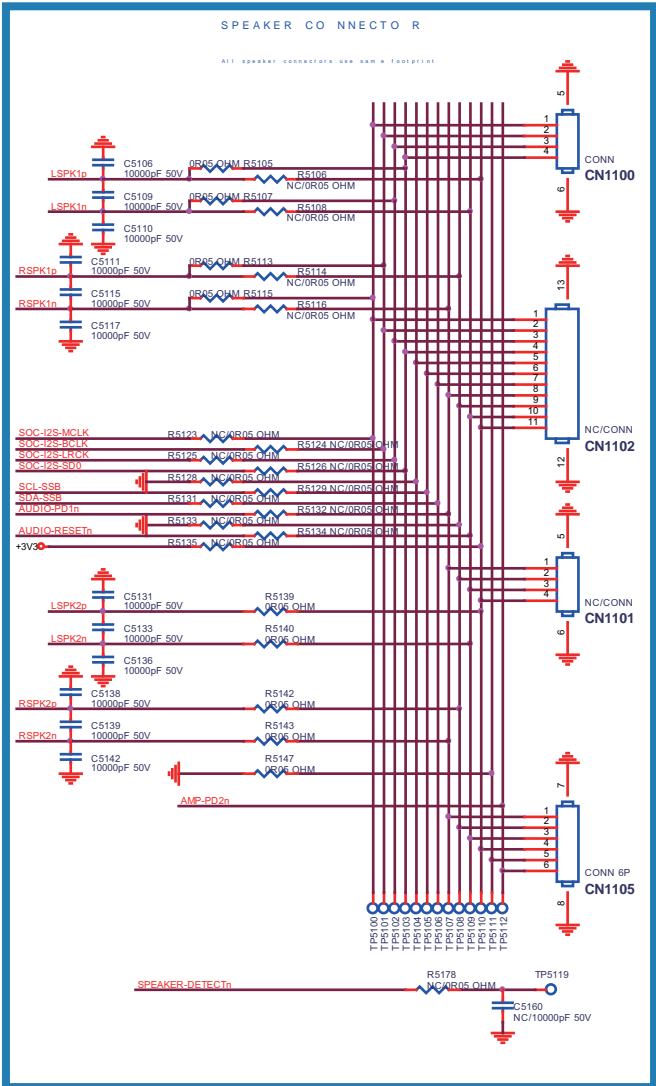
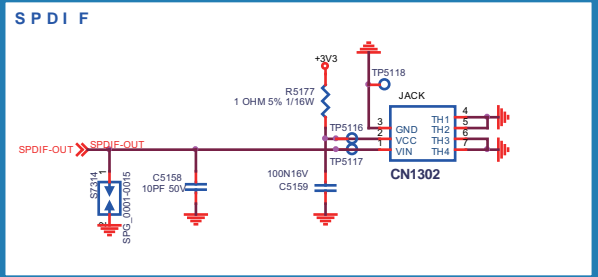
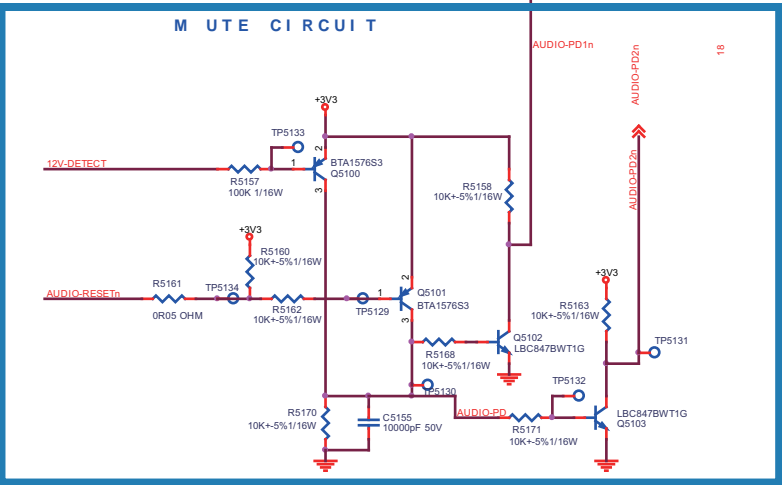
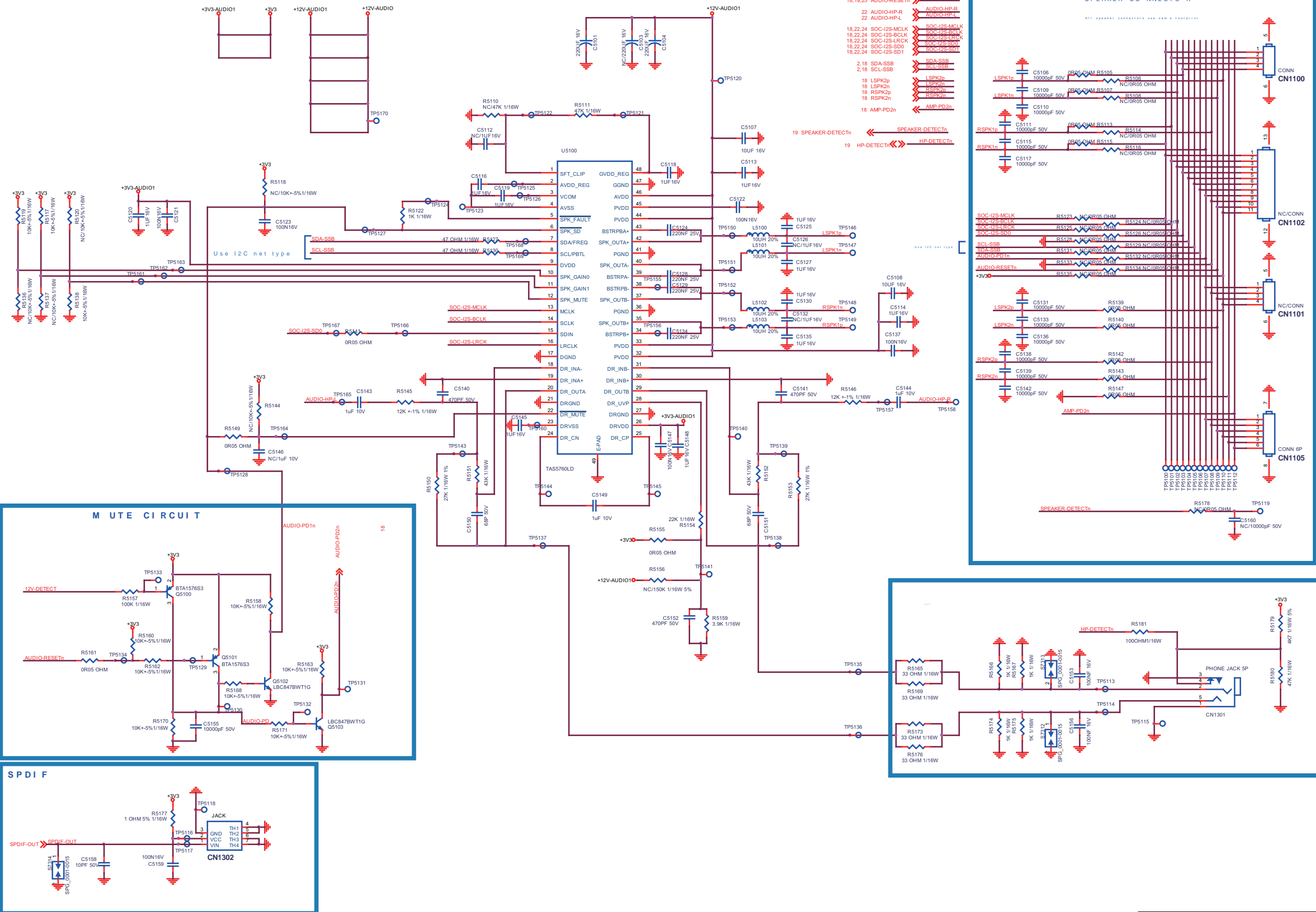
B15

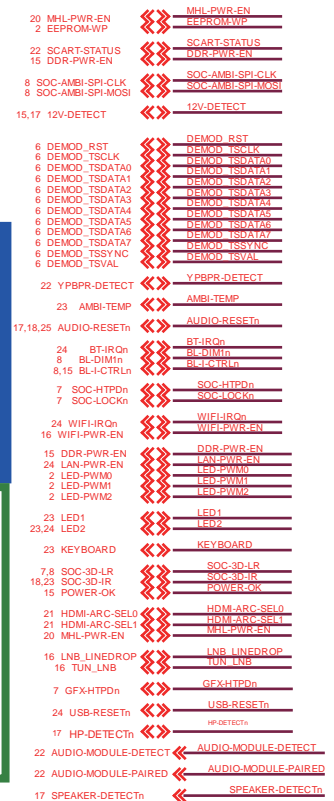
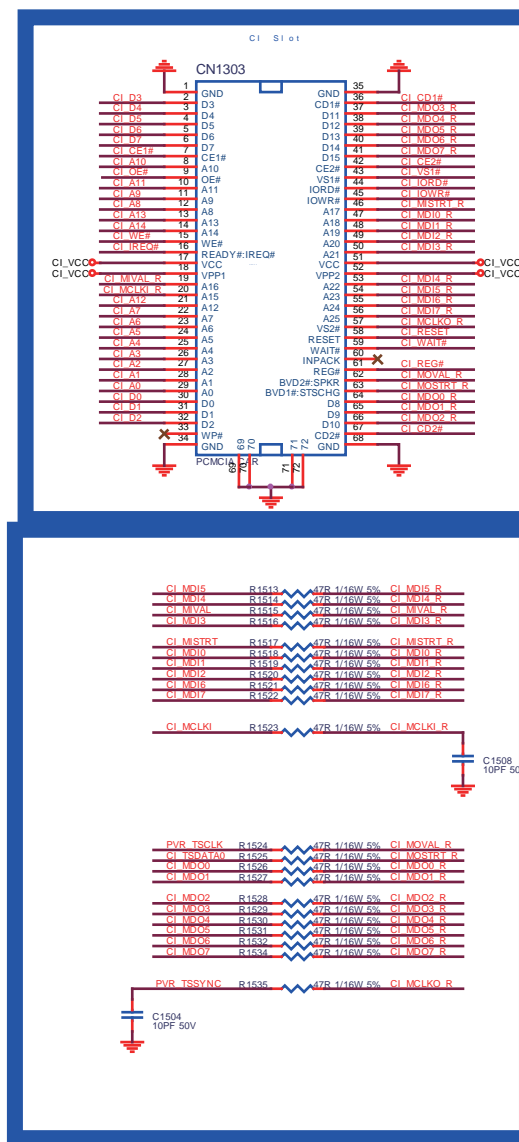


B16

AUDIO-1st-CLASS-D-AMP

B16

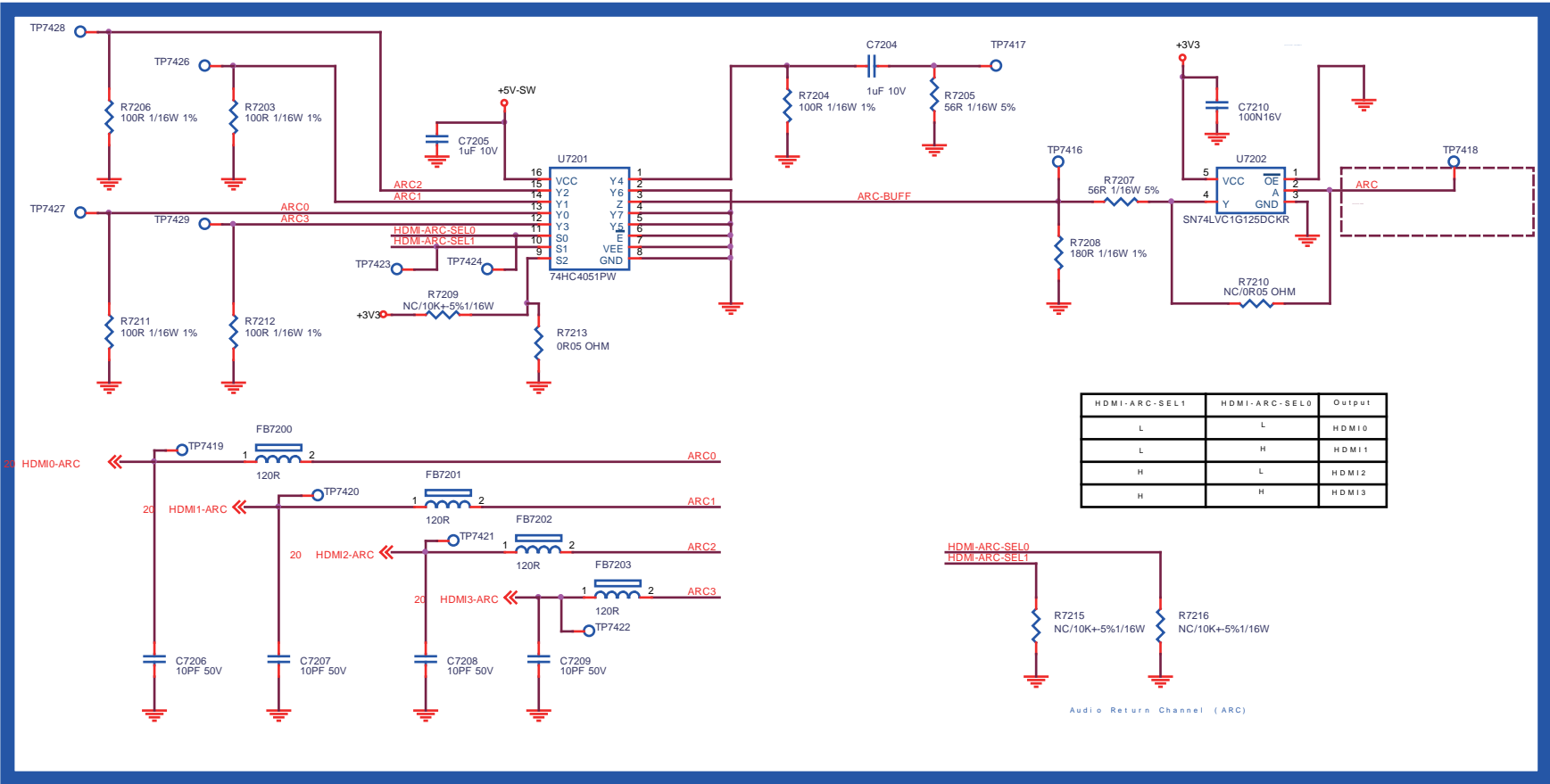
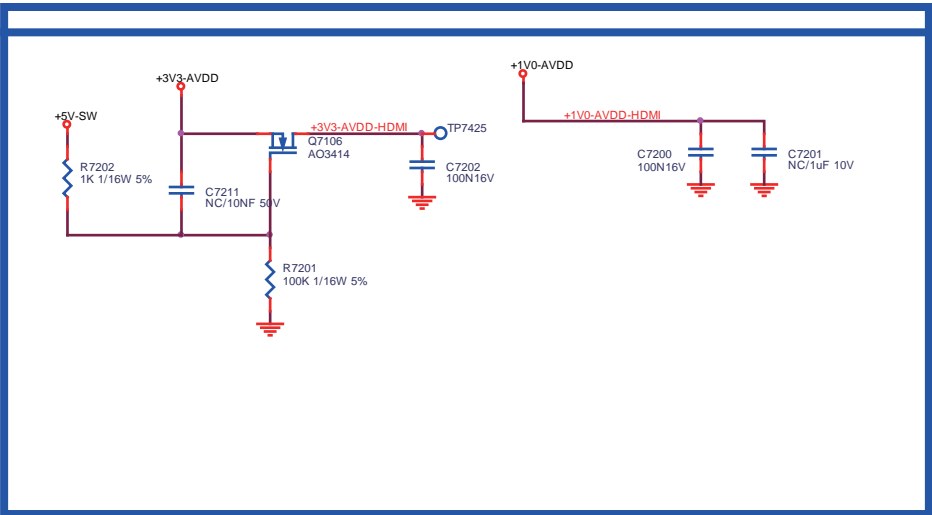


[illegible]

B20

HDMI-SOC-ARC

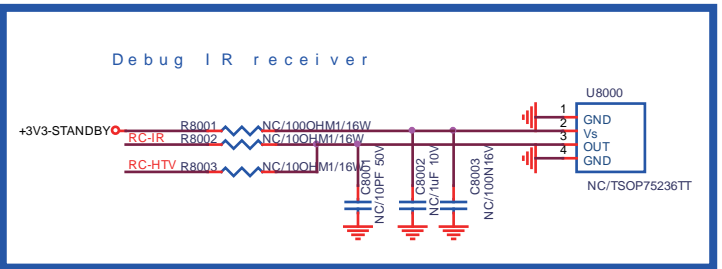
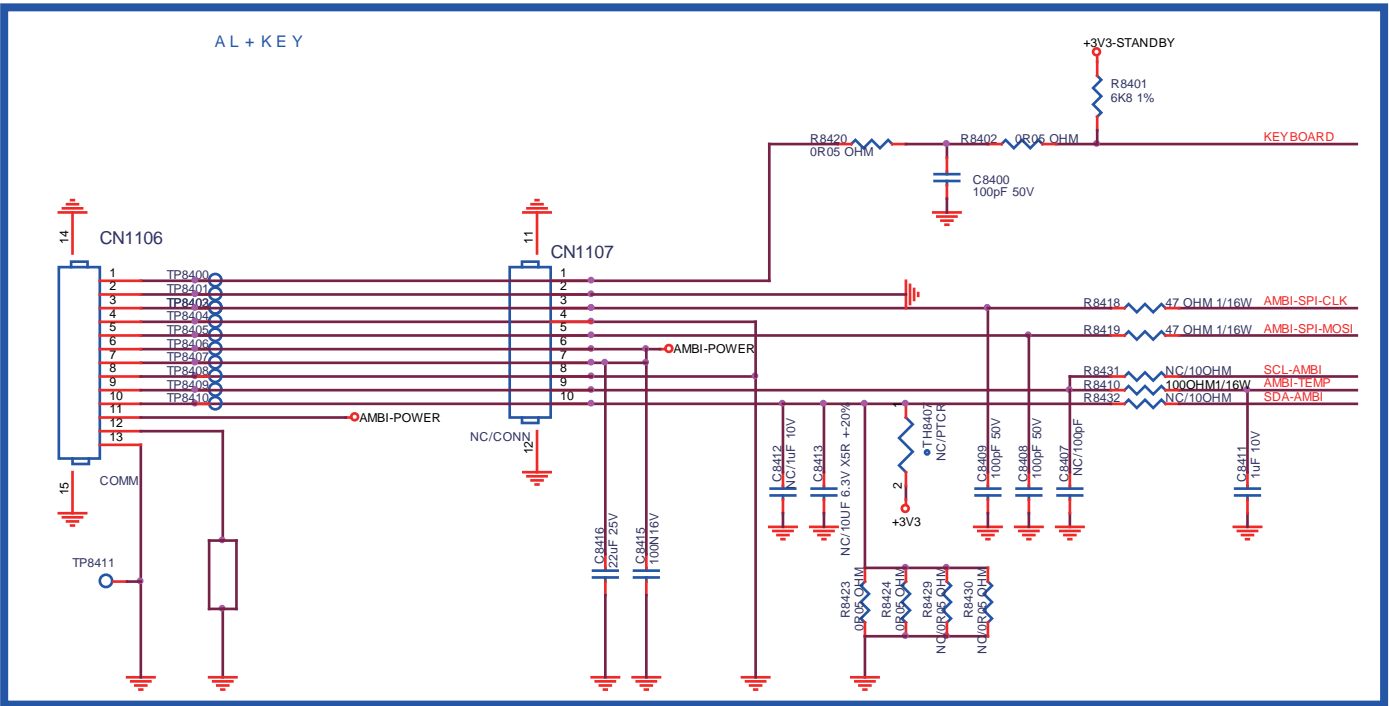
B20



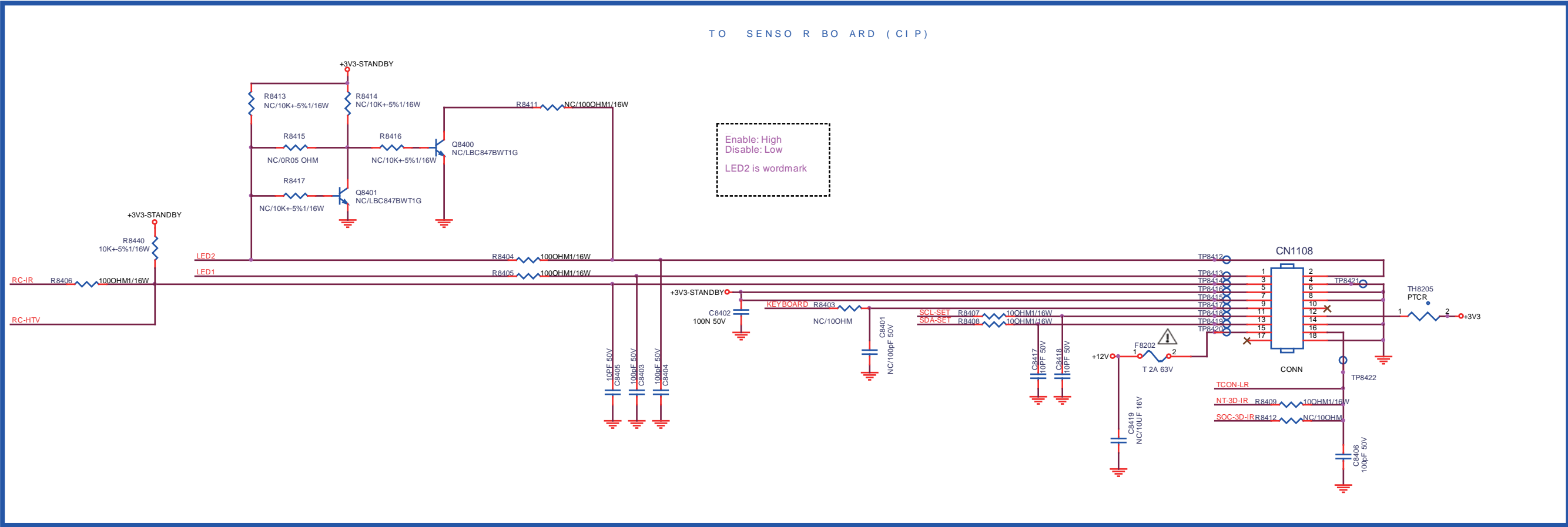
B22

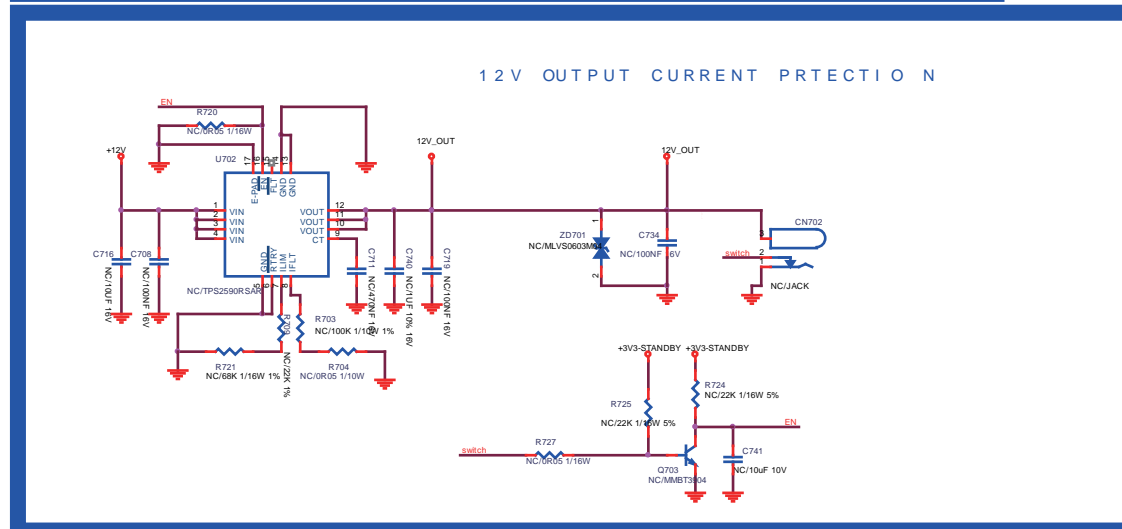
CTRL-CONNECTORS

B22



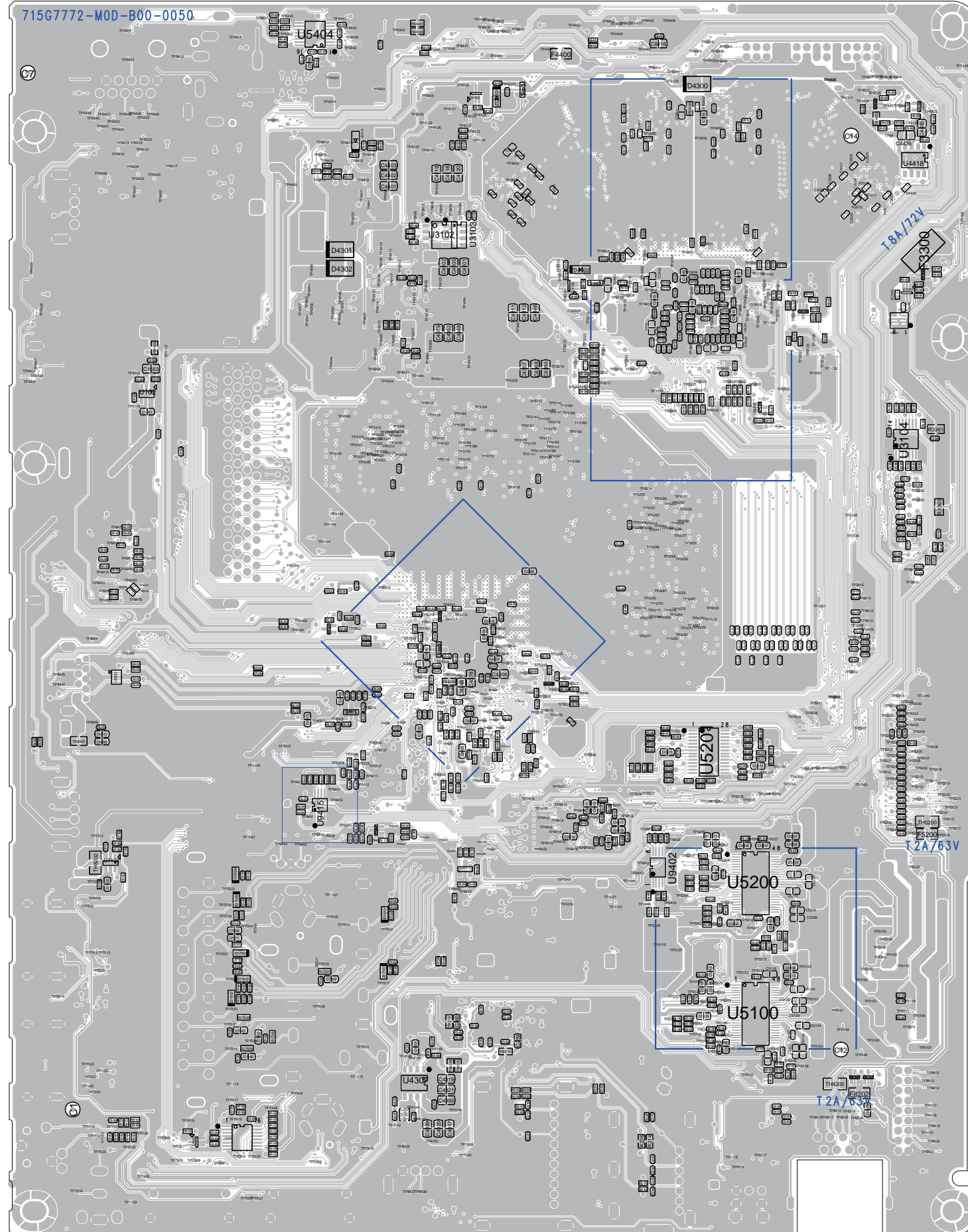
AMBI-SPI-CLK	AMBI-SPI-CLK	8
AMBI-SPI-MOSI	AMBI-SPI-MOSI	8
AMBI-TEMP	AMBI-TEMP	19
SCL-AMBI	SCL-AMBI	8
SDA-AMBI	SDA-AMBI	8
SOC-CTRL-DISP1	SOC-CTRL-DISP1	7
KEYBOARD	KEYBOARD	19
RC-IR	RC-IR	2,18,25
NT-3D-IR	NT-3D-IR	7,8,18
SOC-3D-IR	SOC-3D-IR	18,19
SDA-SET	SDA-SET	2
SCL-SET	SCL-SET	2
SOC-RX-SERVICE	SOC-RX-SERVICE	2,25
SOC-TX-SERVICE	SOC-TX-SERVICE	2,25
LED1	LED1	19
LED2	LED2	19,24
AUDIO-RESETn	AUDIO-RESETn	17,18,19,25
AUDIO-HTV-L	AUDIO-HTV-L	22,25
AUDIO-HTV-R	AUDIO-HTV-R	22,25
STANDBY	STANDBY	2,15
RC-HTV	RC-HTV	25
TCON-LR	TCON-LR	9



20030_535.eps

C	2015-11-03

715G7772-M0D-B00-0050



715G7772

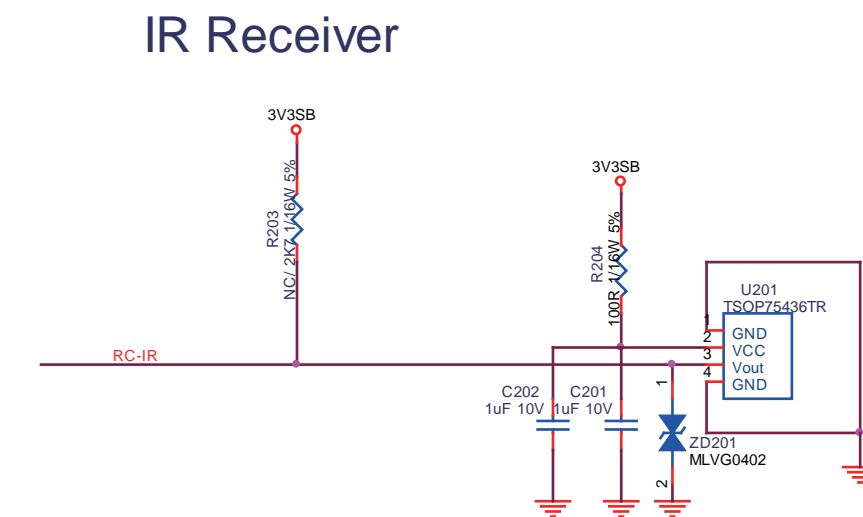
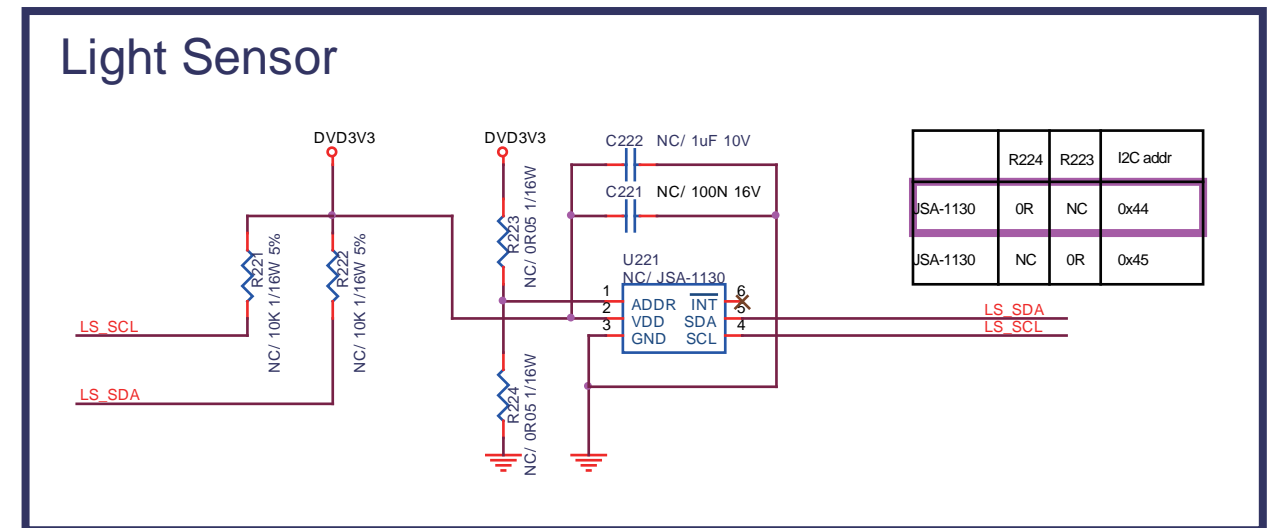
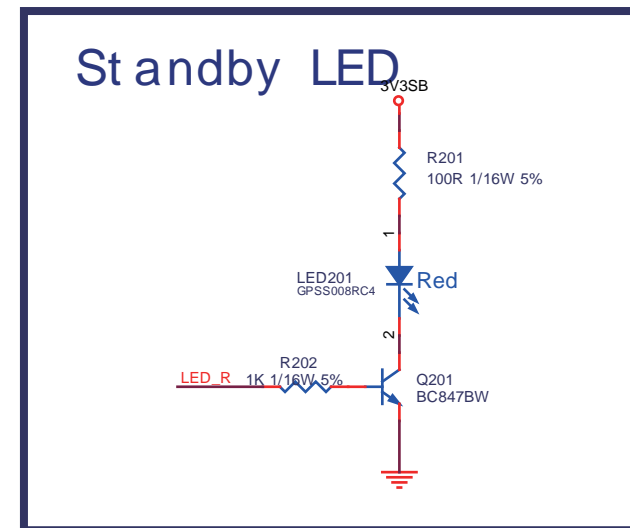
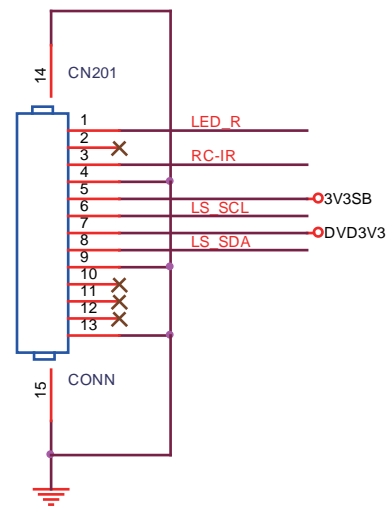
30_537.eps

10-12-1 IR & LED & Light Sensor

J

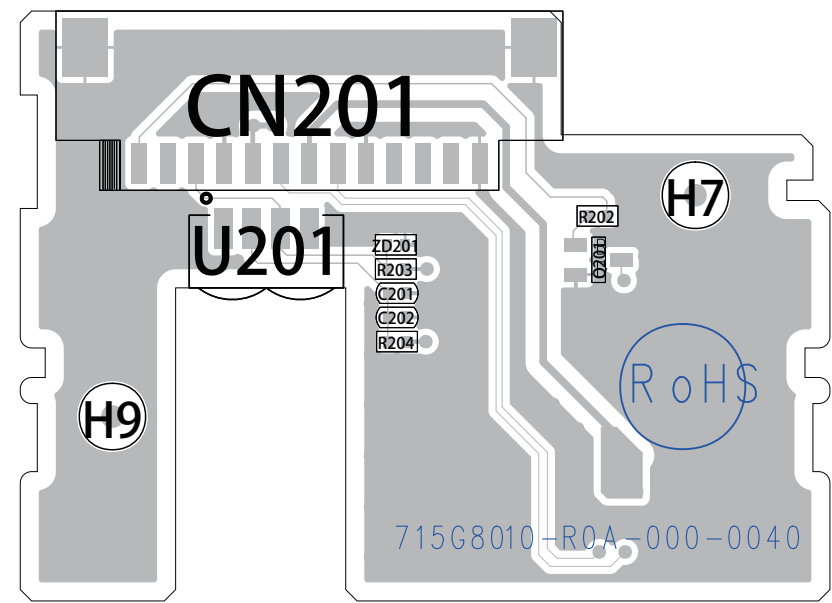
IR & LED & Light Sensor

J

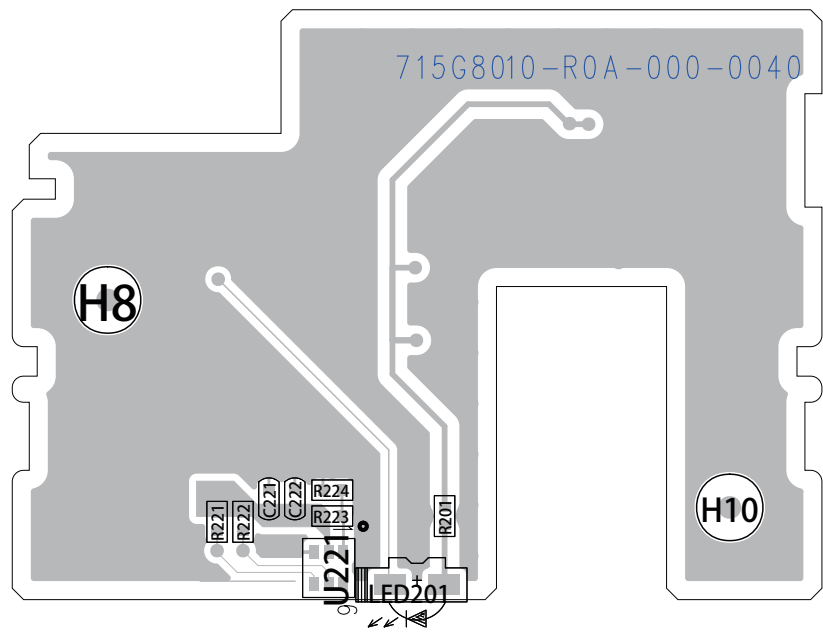


10-12-2 IR/LED board layout

Layout IR/LED panel (top side)



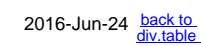
Layout IR/LED panel (bottom side)



IR/LED panel layout top/bottom	715G8010	2015-09-27

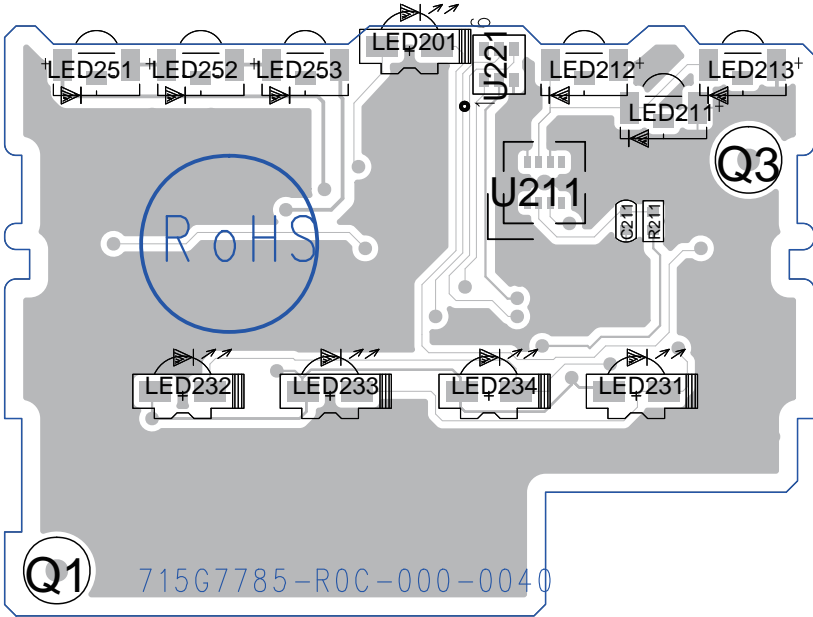
10-13-1 LED&IR&3D&Light sensor

J

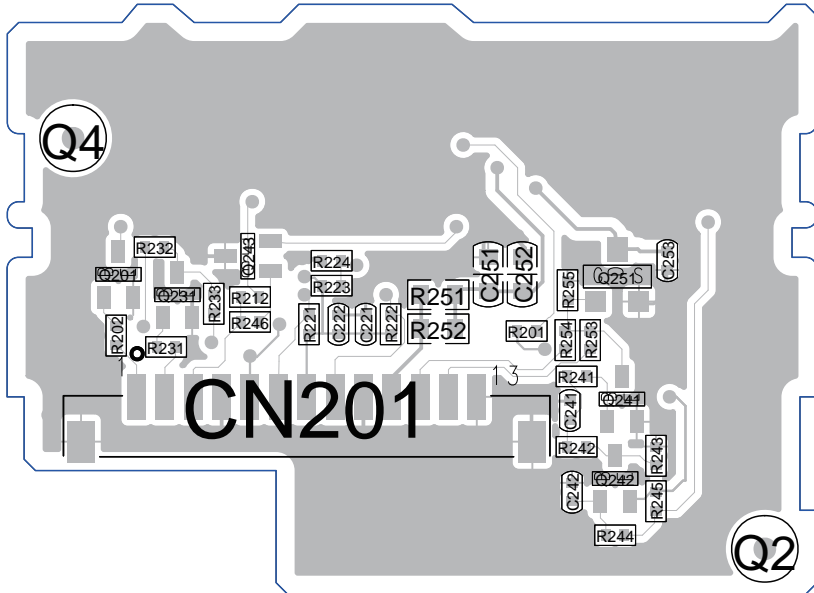


10-13-2 IR/LED board layout

Layout IR/LED panel (top side)

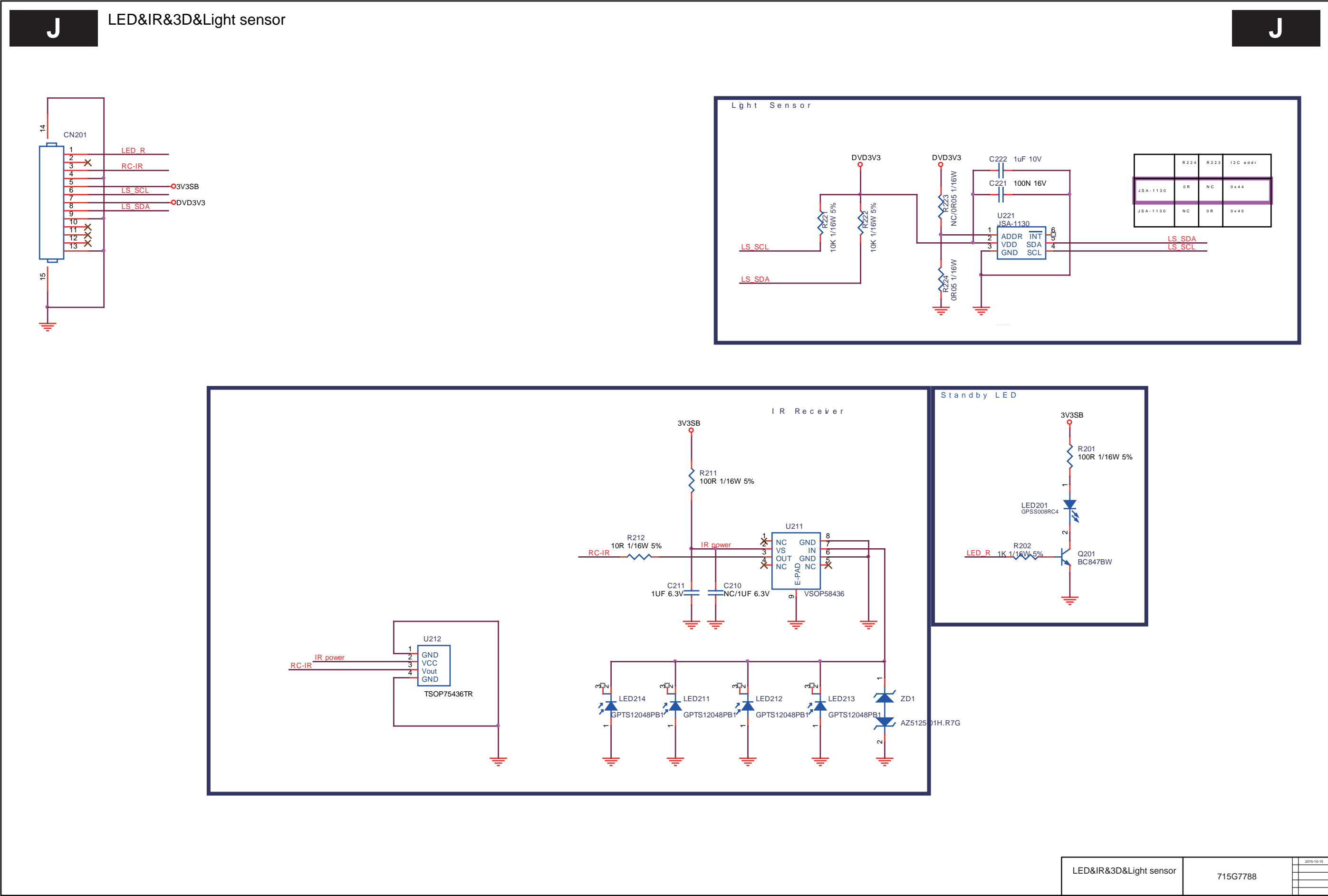


Layout IR/LED panel (bottom side)



IR/LED panel layout top/bottom	715G7785	2015-07-28

10.14 J 715G7788 IR/LED Panel
10-14-1 LED&IR&3D&Light sensor

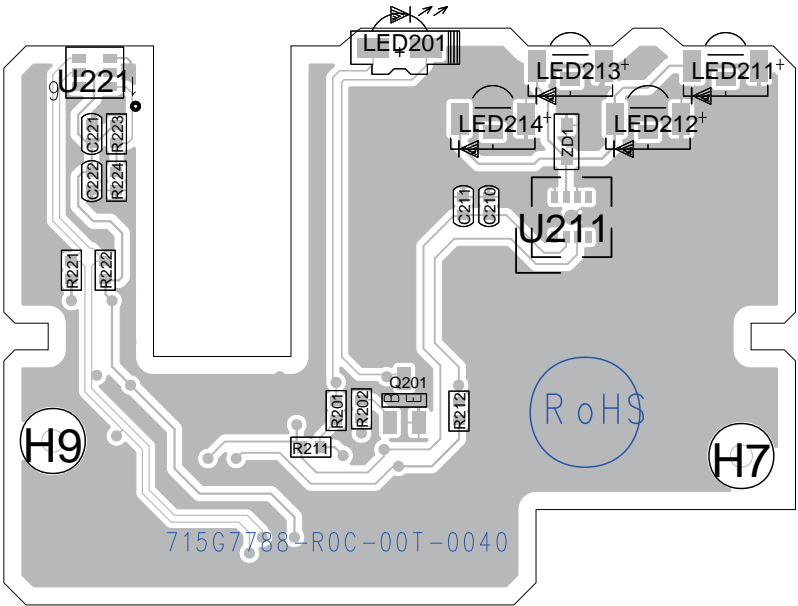


LED&IR&3D&Light sensor

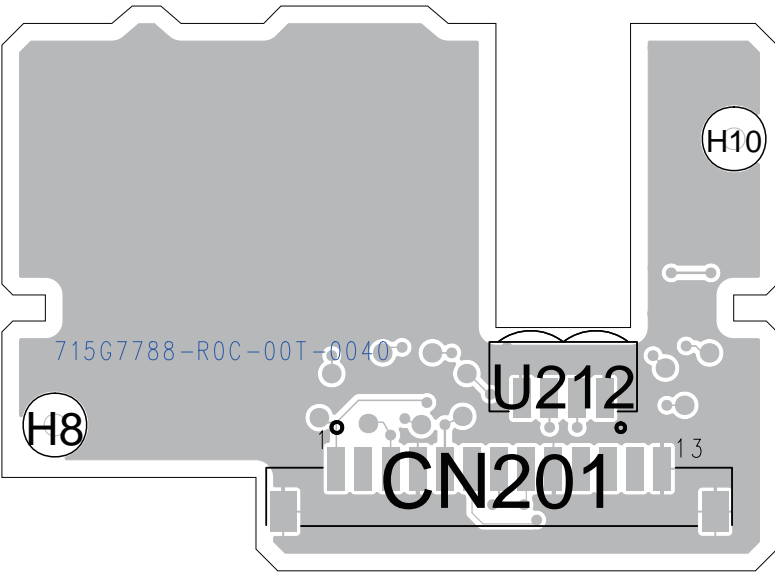
715G7788

2016-10-15

Layout IR/LED panel (top side)

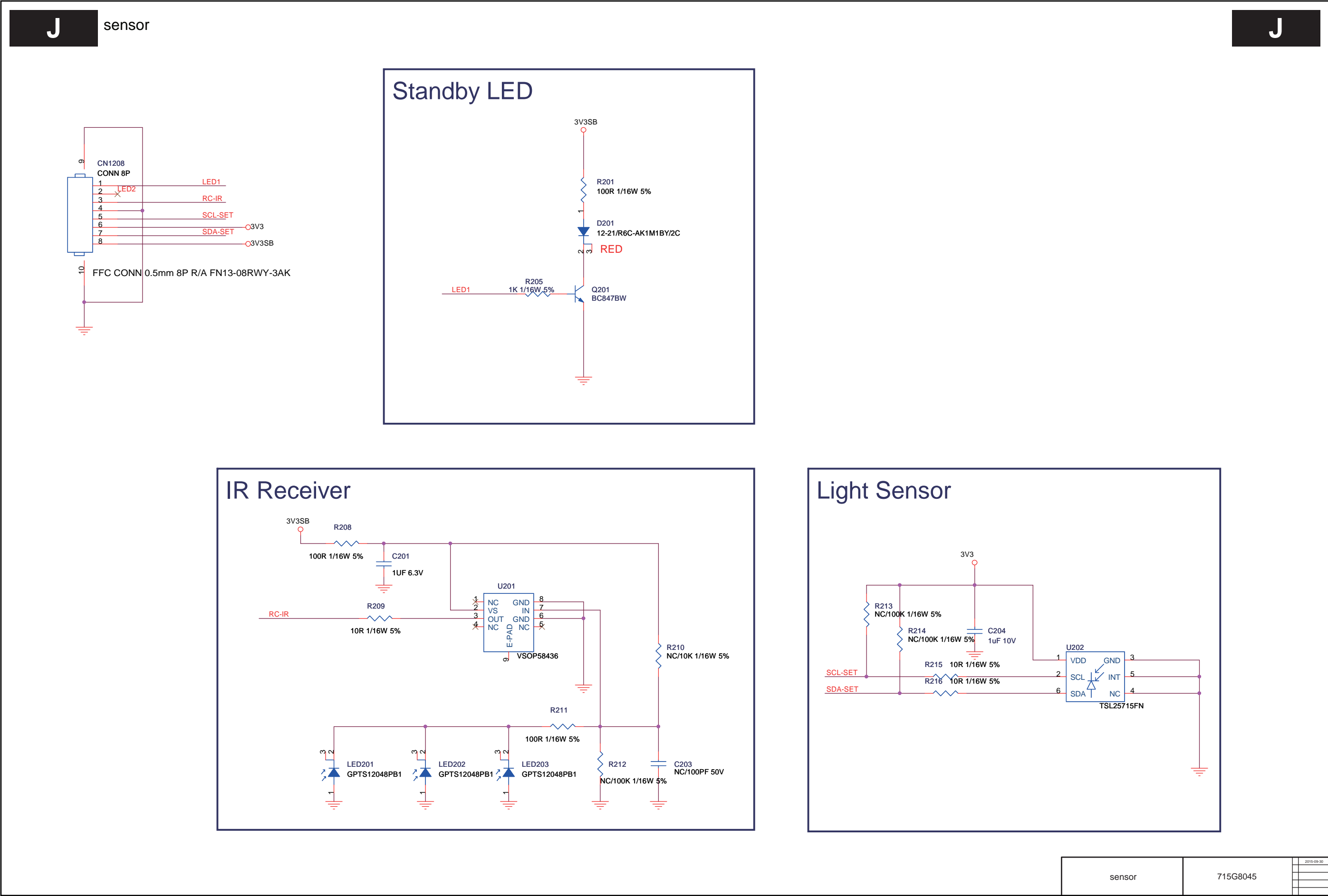


Layout IR/LED panel (bottom side)

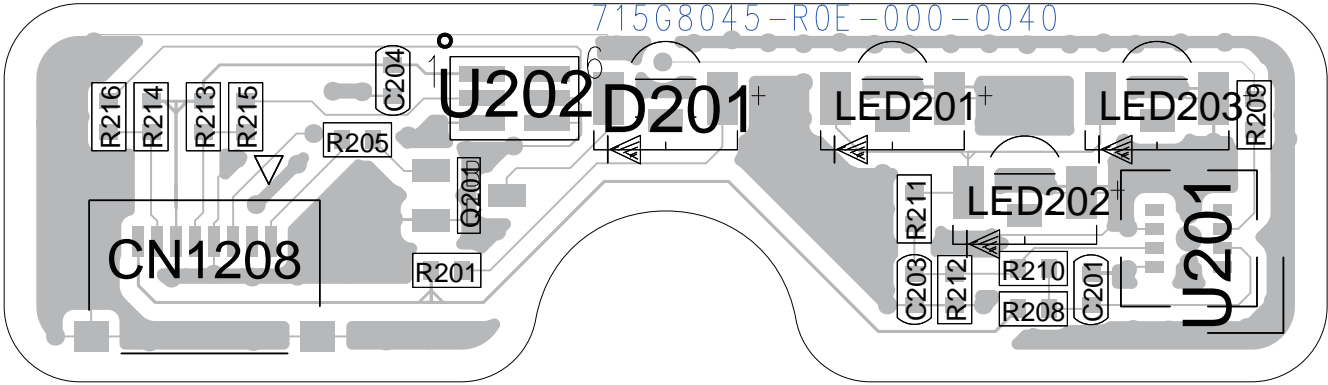


IR/LED panel layout top/bottom	715G7788	2015-09-20

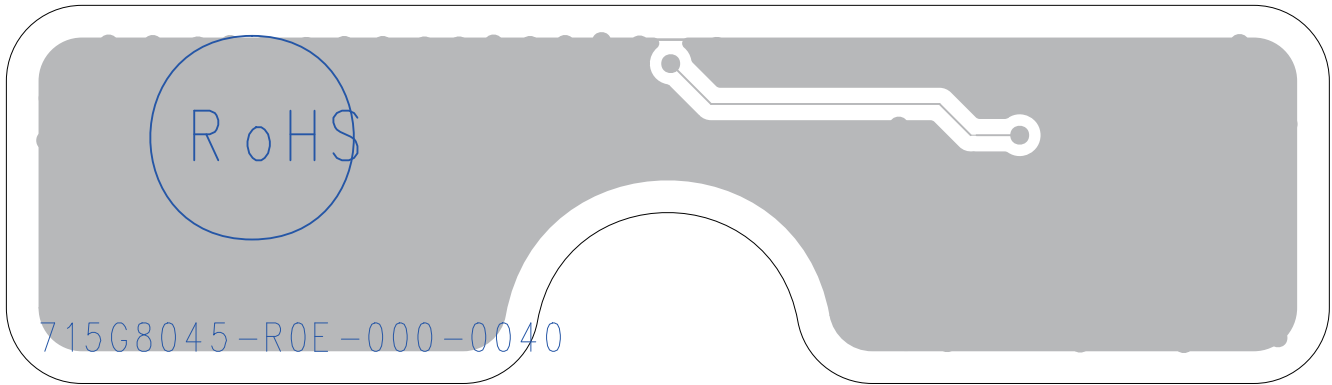
10.15 J 715G8045 IR/LED Panel
10-15-1 sensor



Layout IR/LED panel (top side)

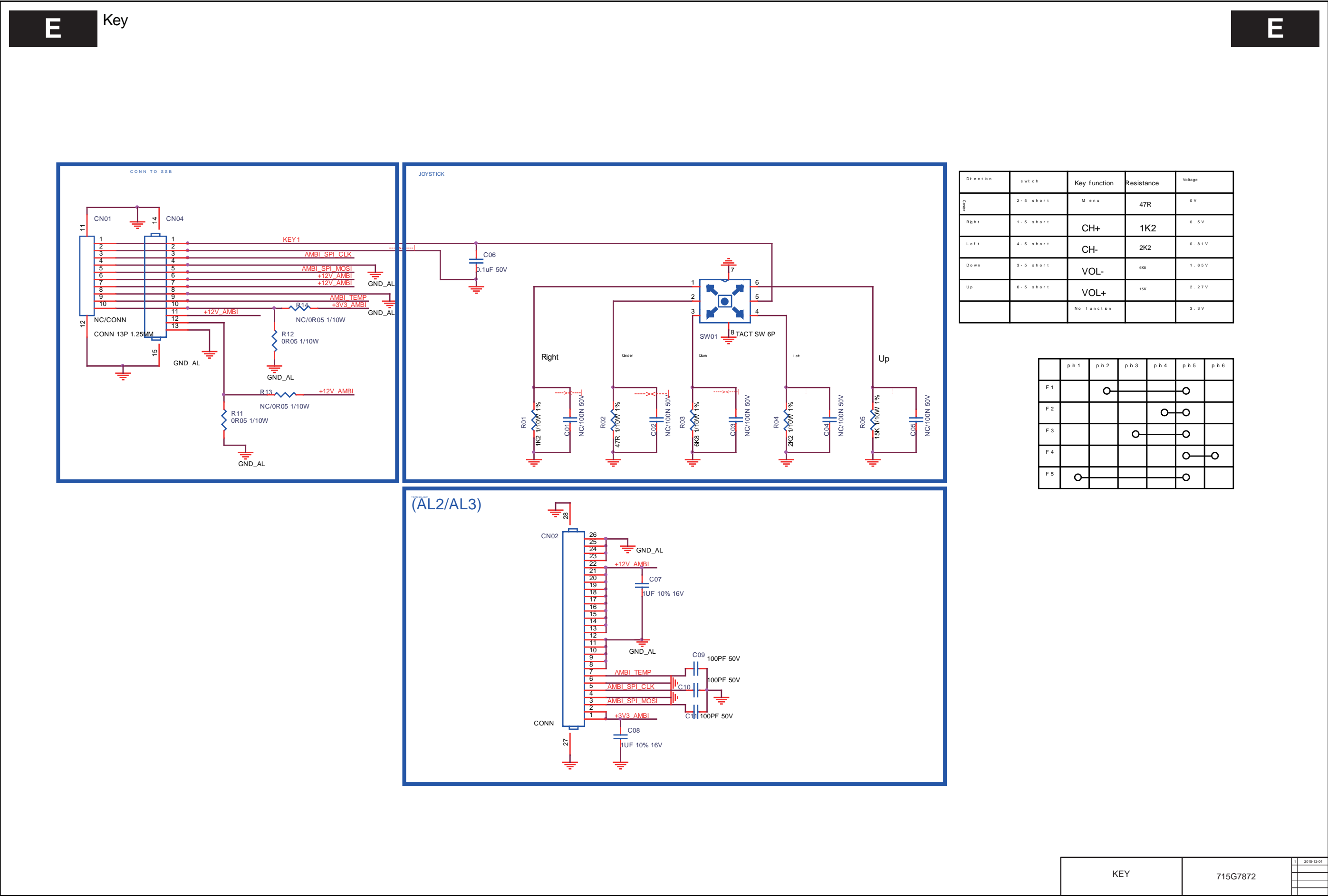


Layout IR/LED panel (bottom side)

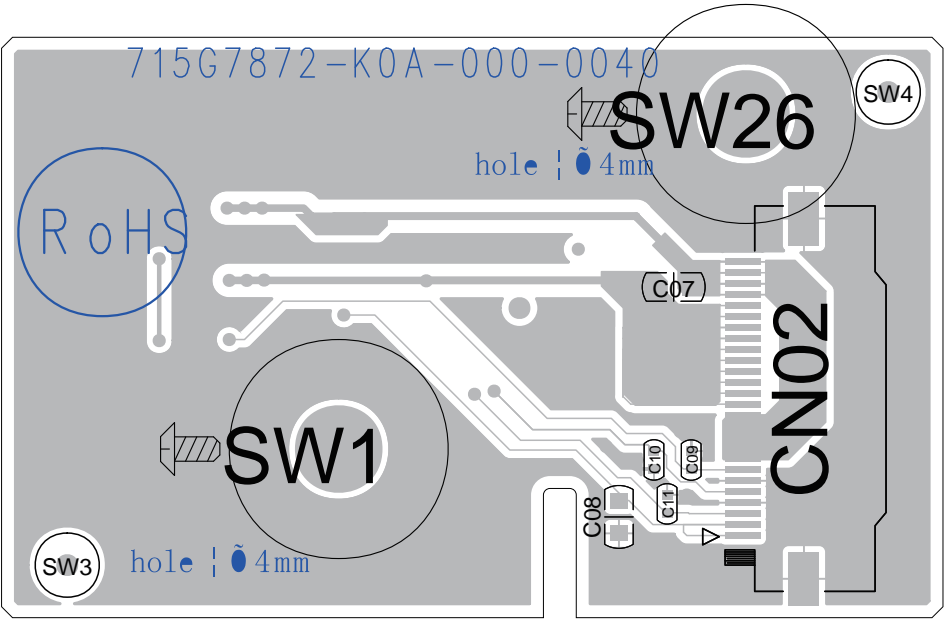


IR/LED panel layout top/bottom	715G8045	2015-09-20

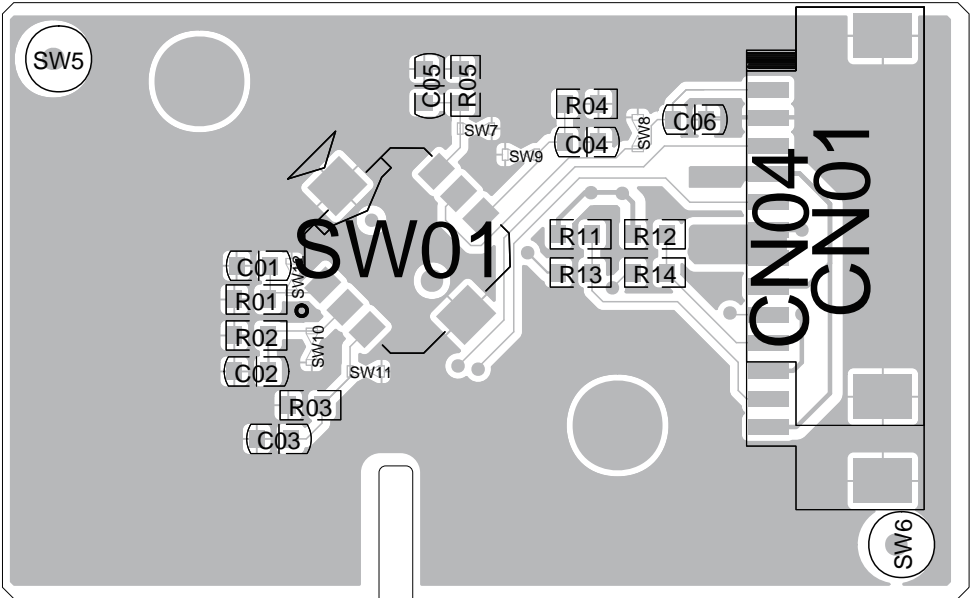
10.16 E 715G7872 Keyboard control panel
10-16-1 Key



Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)



10.17 E 715G7065 Keyboard control panel
10-17-1 Key+AL

E

KEY+AL

E

CONN TO SSB

Co-layot

JOYSTICK

Right Center Down Left Up

TO AMBI LIGHT

Key+AL Side Main Board Side

Key+AL Side	Main Board Side	Signal
10	10	AL3 TI/AMS
10	8	AL3 TI only
10	6	AL2 TI only
13	13	AL4 TI/AMS

Direction	switch	Key function	Resistance	Voltage
Center	2-5 short	Menu	0R	0V
Right	1-5 short	CH+	1K2	0.5V
Left	4-5 short	CH-	2K2	0.81V
Down	3-5 short	VOL-	6K8	1.65V
Up	6-5 short	VOL+	15K	2.27V
		No function		3.3V

Joystick circuit diagram

	pin1	pin2	pin3	pin4	pin5	pin6
F1						
F2						
F3						
F4						
F5						

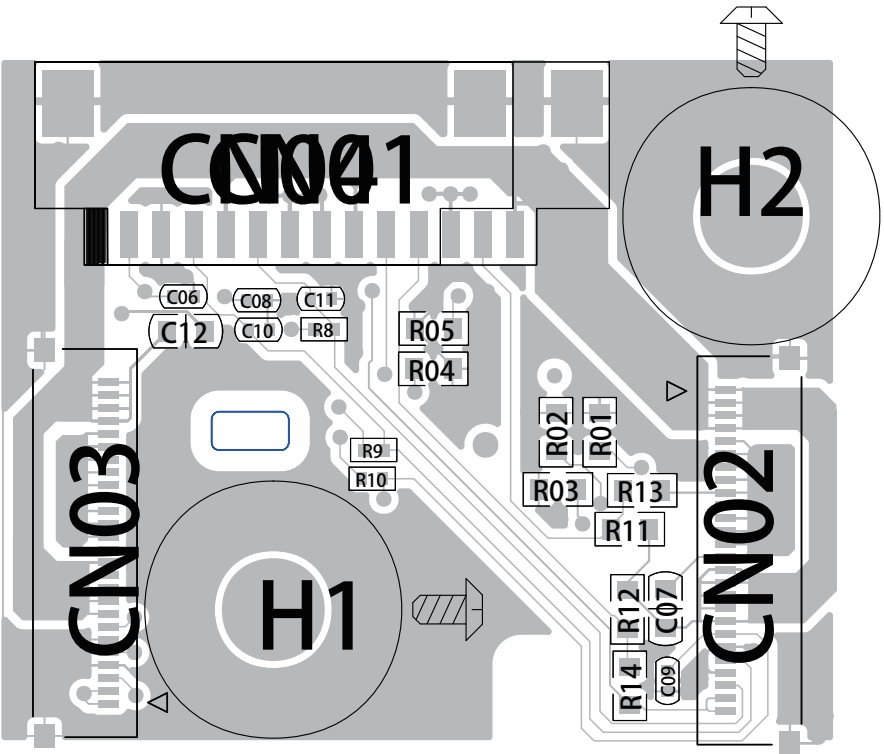
KEY+AL

715G7065

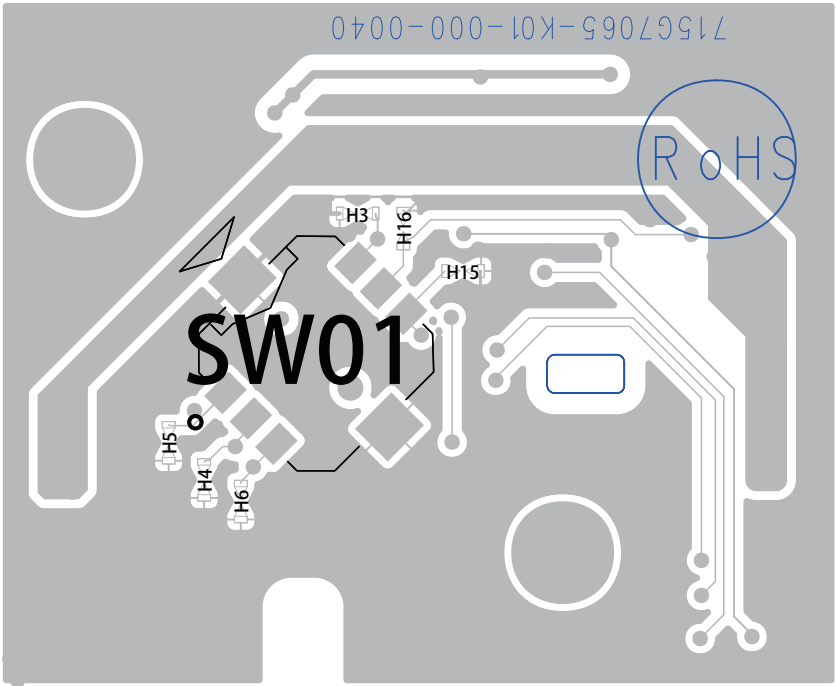
1 2014-12-11

19812_516.eps

Layout Keyboard control panel (top side)



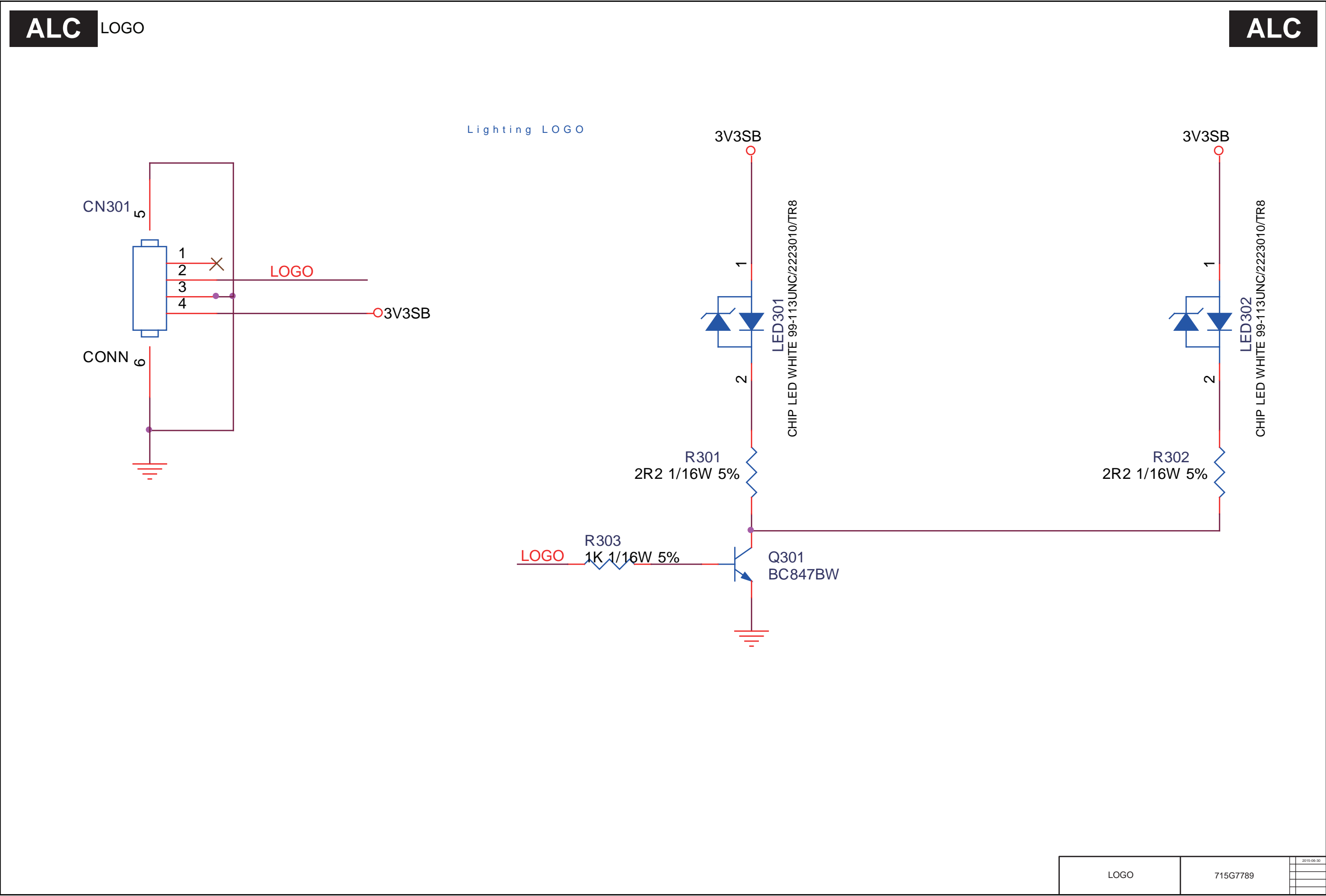
Layout Keyboard control panel (bottom side)



Keyboard control panel layout top/bottom	715G7065	1	2014.11.08

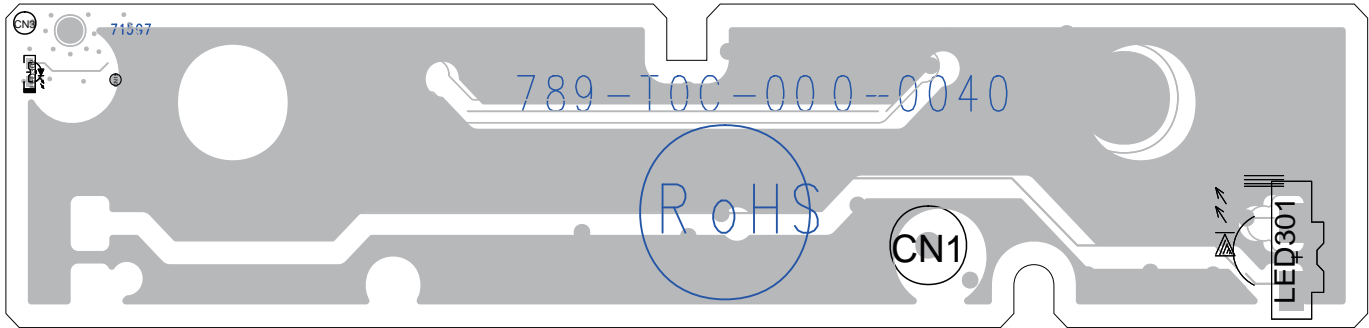
10.18 ALC 715G7789 LED board

10-18-1 LOGO

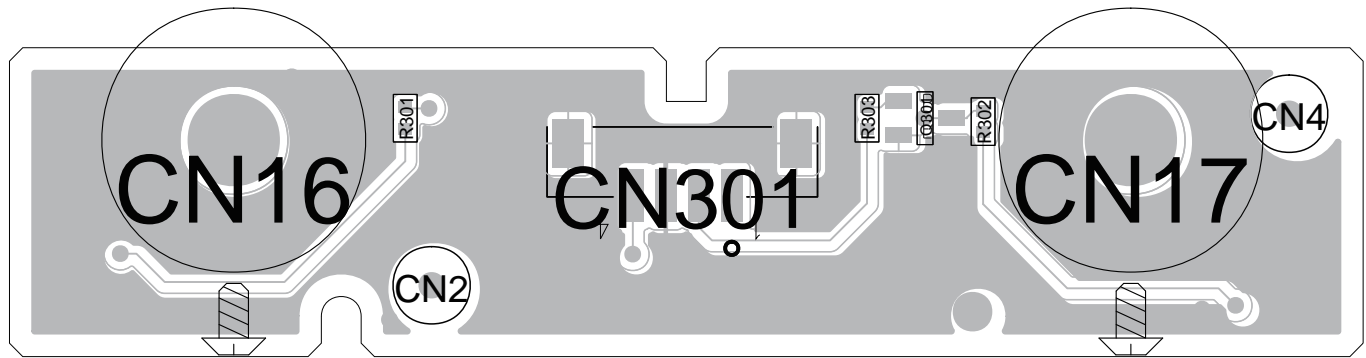


10-18-2 LED board layout top/bottom

Layout LED board (top side)



Layout LED board (bottom side)



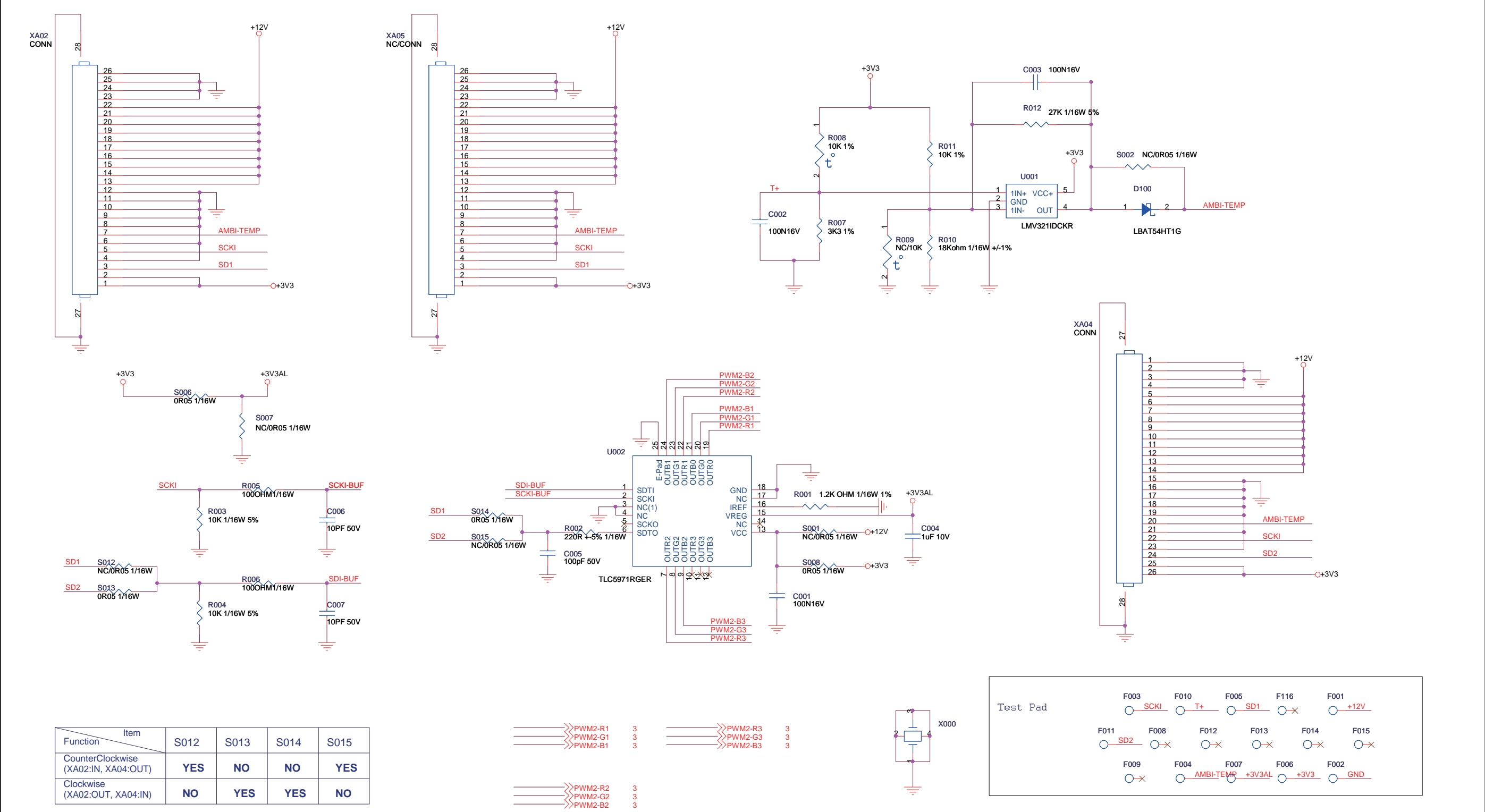
LED board layout top/bottom	715G7789	1	2016-07-01

10.19 AL 715G7004 Ambilight Board
10-19-1 TCL5971

AL01

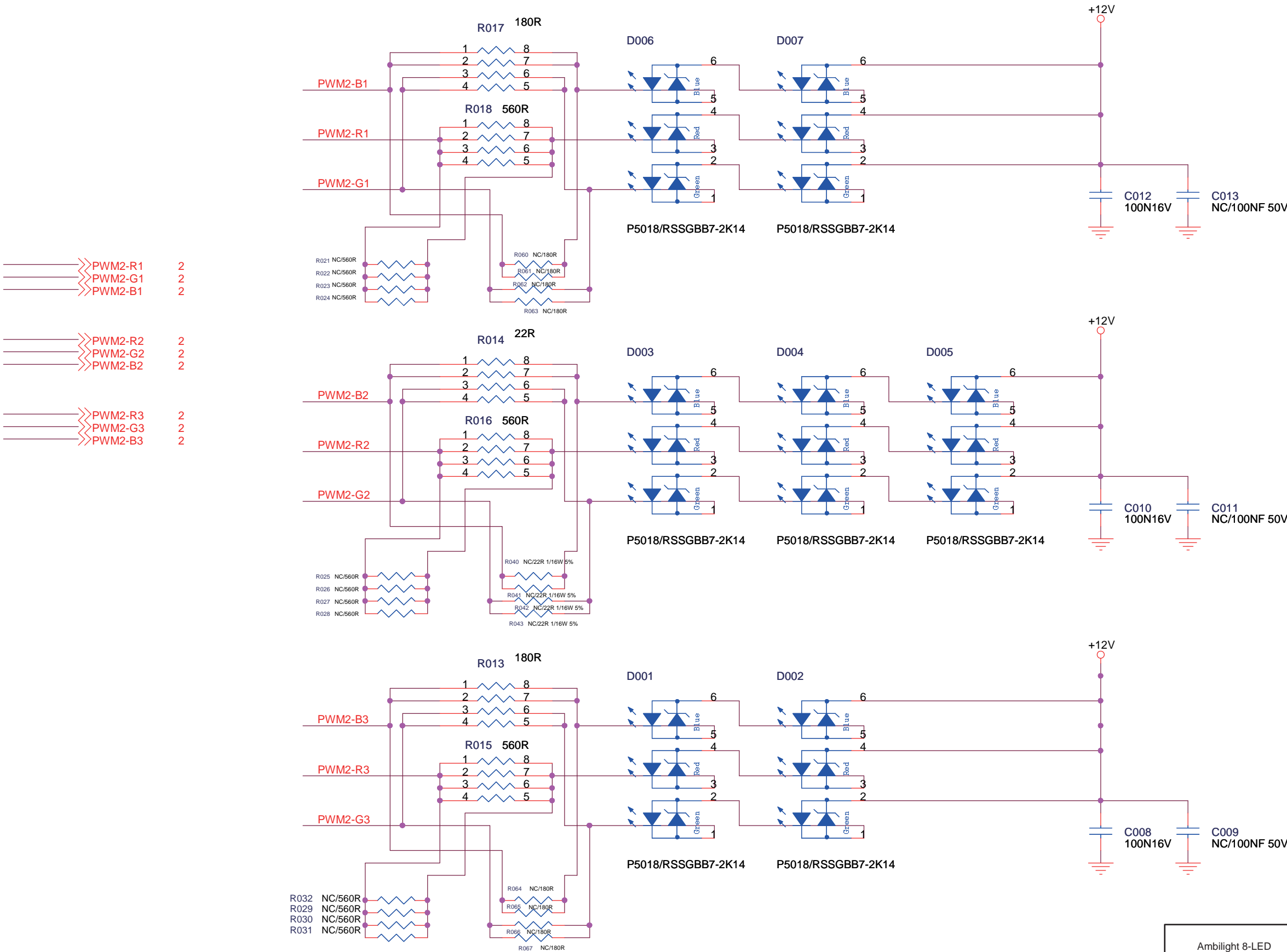
TCL5971

AL01



AL02 Ambilight 8-LED

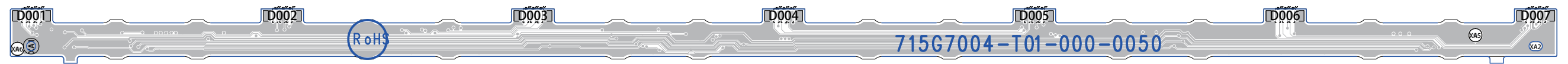
AL02



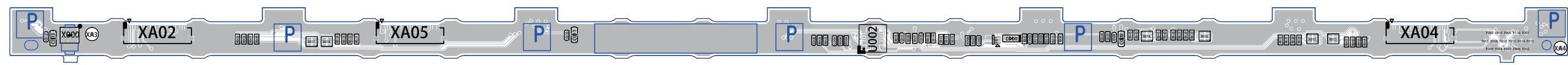
Ambilight 8-LED	715G7004	2014-07-02

10-19-3 Ambilight Board layout

Layout Ambilight Board (top side)

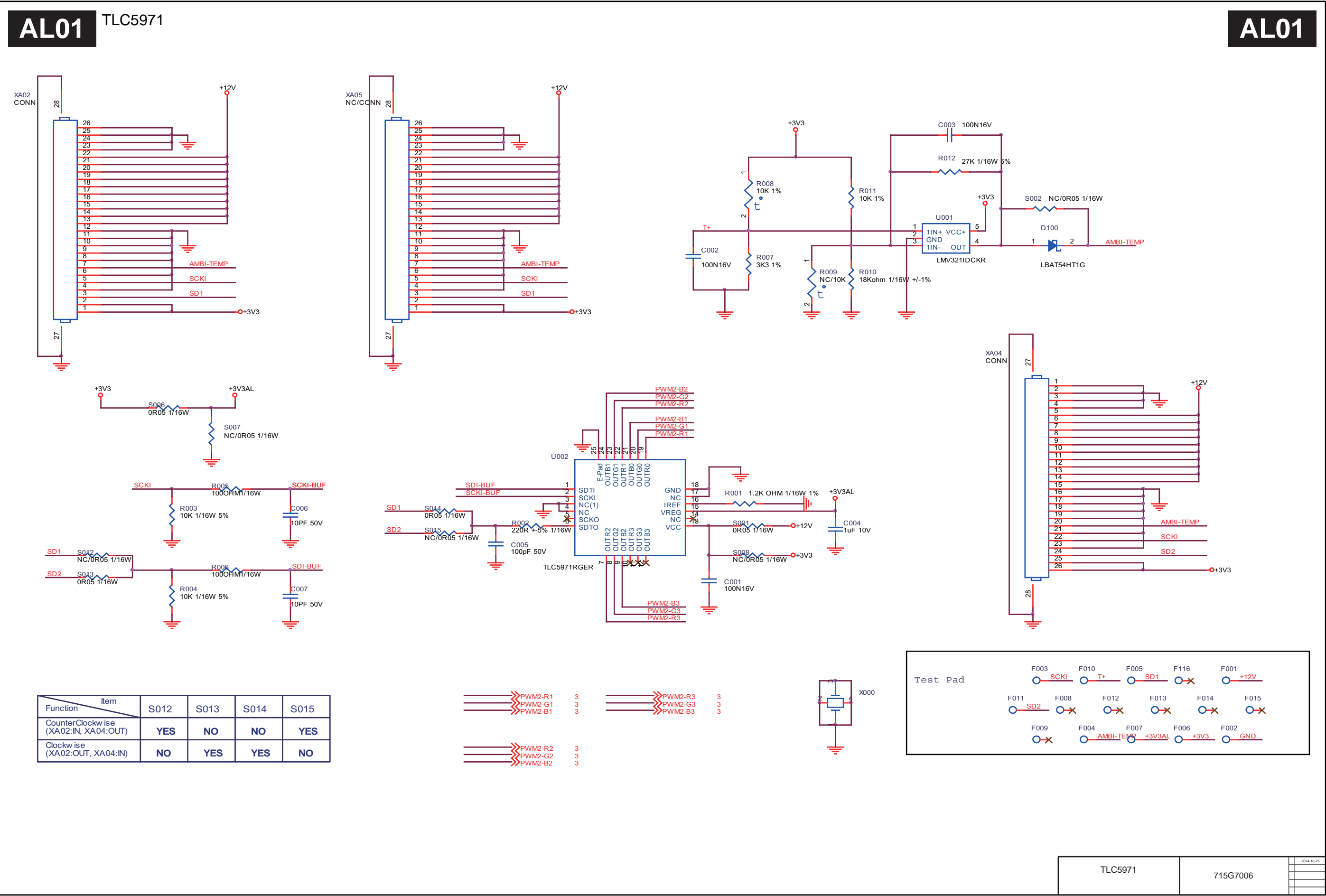


Layout Ambilight Board (bottom side)



Ambilight Board layout top/bottom	715G7004	1	2014-10-01

10.20 AL 715G7006 Ambilight Board
10-20-1 Connector

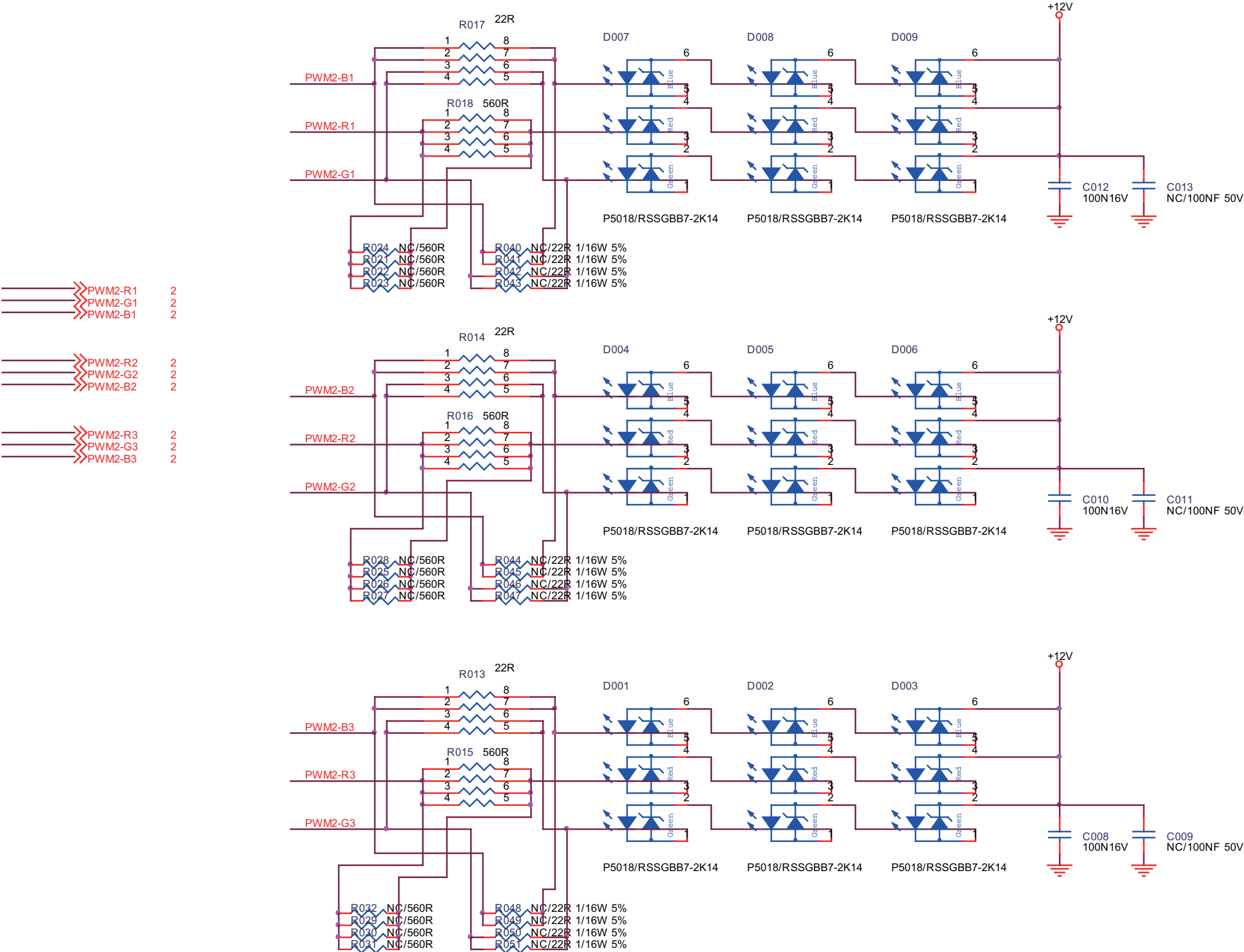


10-20-2 Ambilight 9-LED

AL02

Ambilight 9-LED

AL02



Ambilight 9-LED	715G7006	B	2014-10-25

10-20-3 Ambilight board layout top/bottom

Layout Ambilight board (top side)



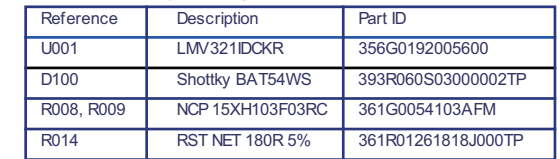
Layout Ambilight board (bottom side)



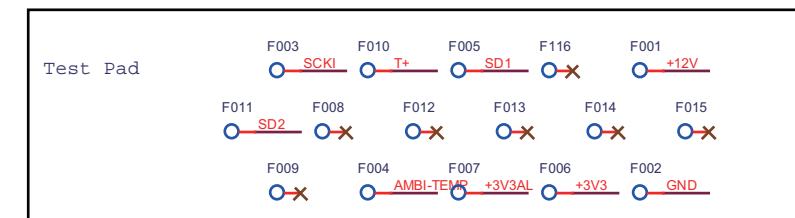
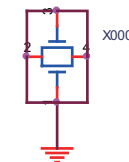
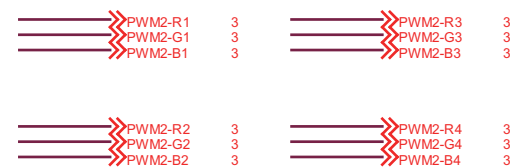
Ambilight board layout top/bottom	715G7007	2014-10-27

AL01 TLC5971

AL01



Function \ Item	S012	S013	S014	S015
CounterClock wise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clock wise (XA02:OUT, XA04:IN)	NO	YES	YES	NO

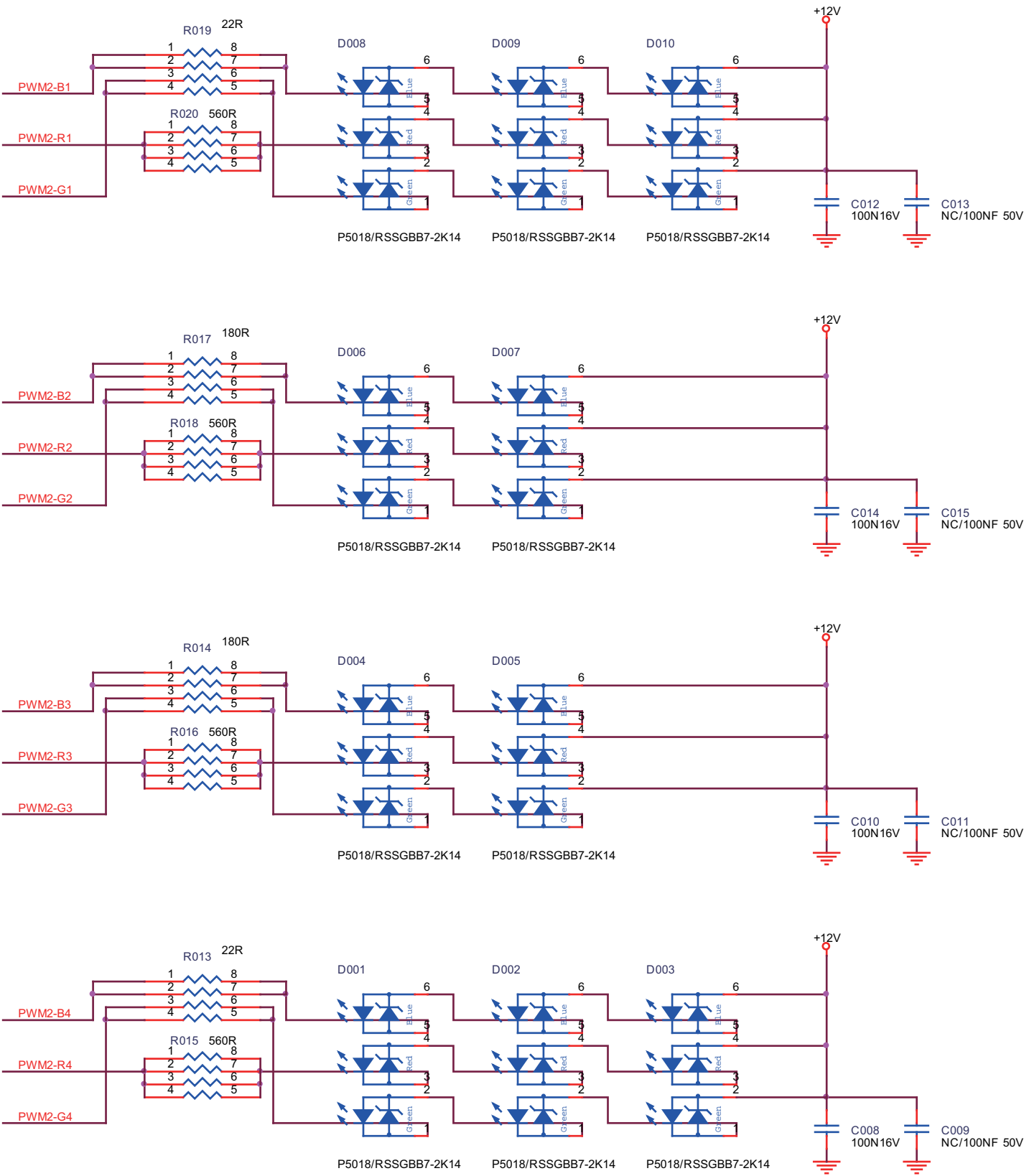


10-21-2 Ambilight 10-LED

AL02 Ambilight 10-LED

AL02

- PWM2-R1 2
- PWM2-G1 2
- PWM2-B1 2
- PWM2-R2 2
- PWM2-G2 2
- PWM2-B2 2
- PWM2-R3 2
- PWM2-G3 2
- PWM2-B3 2
- PWM2-R4 2
- PWM2-G4 2
- PWM2-B4 2



Ambilight 10-LED	715G7007	2014-04-01

10-21-3 Ambilight board layout top/bottom

Layout Ambilight board (top side)



Layout Ambilight board (bottom side)



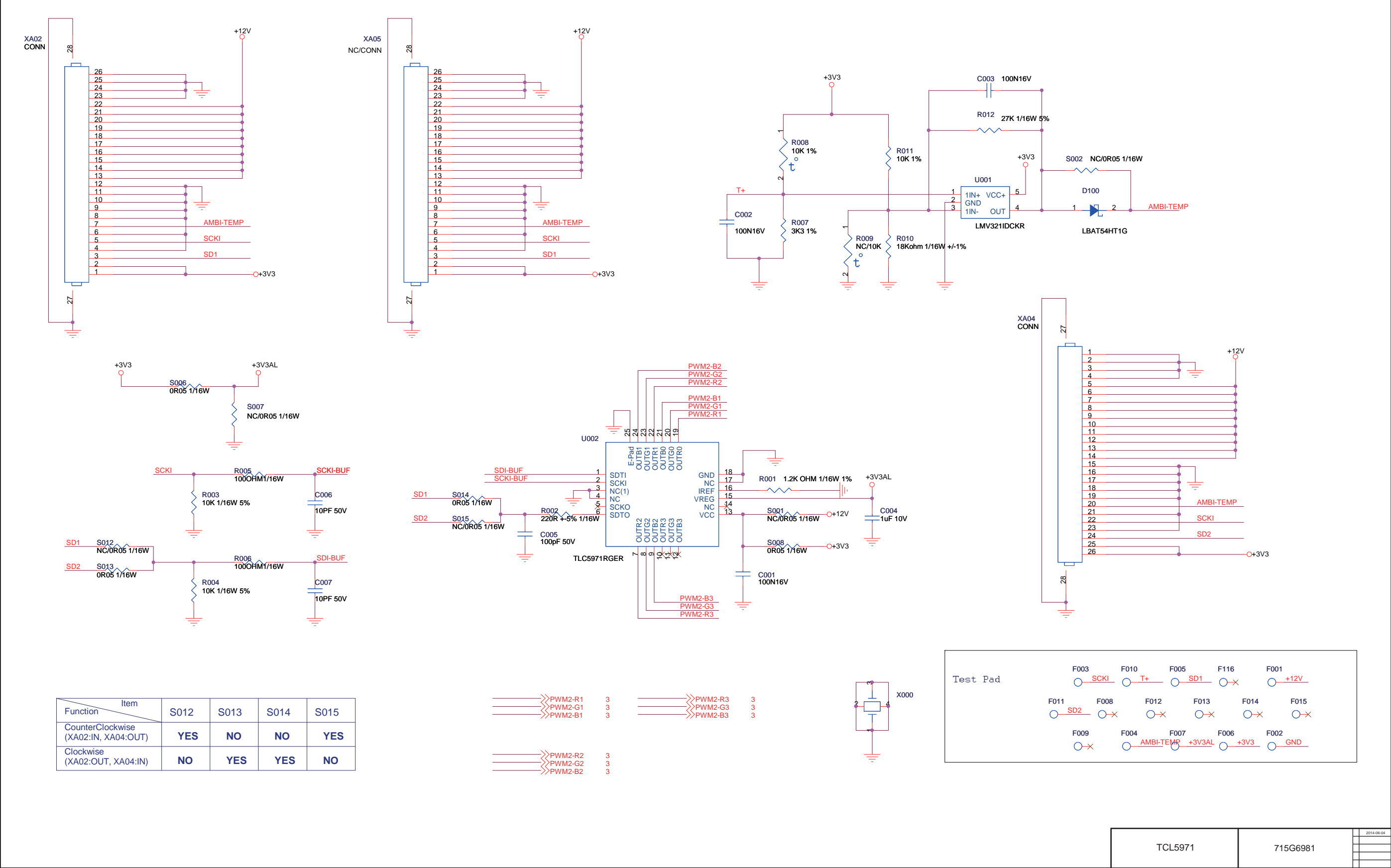
Ambilight board layout top/bottom	715G7007	2014-10-27

10.22 AL 715G6981 Ambilight Board
10-22-1 TCL5971

AL01

TCL5971

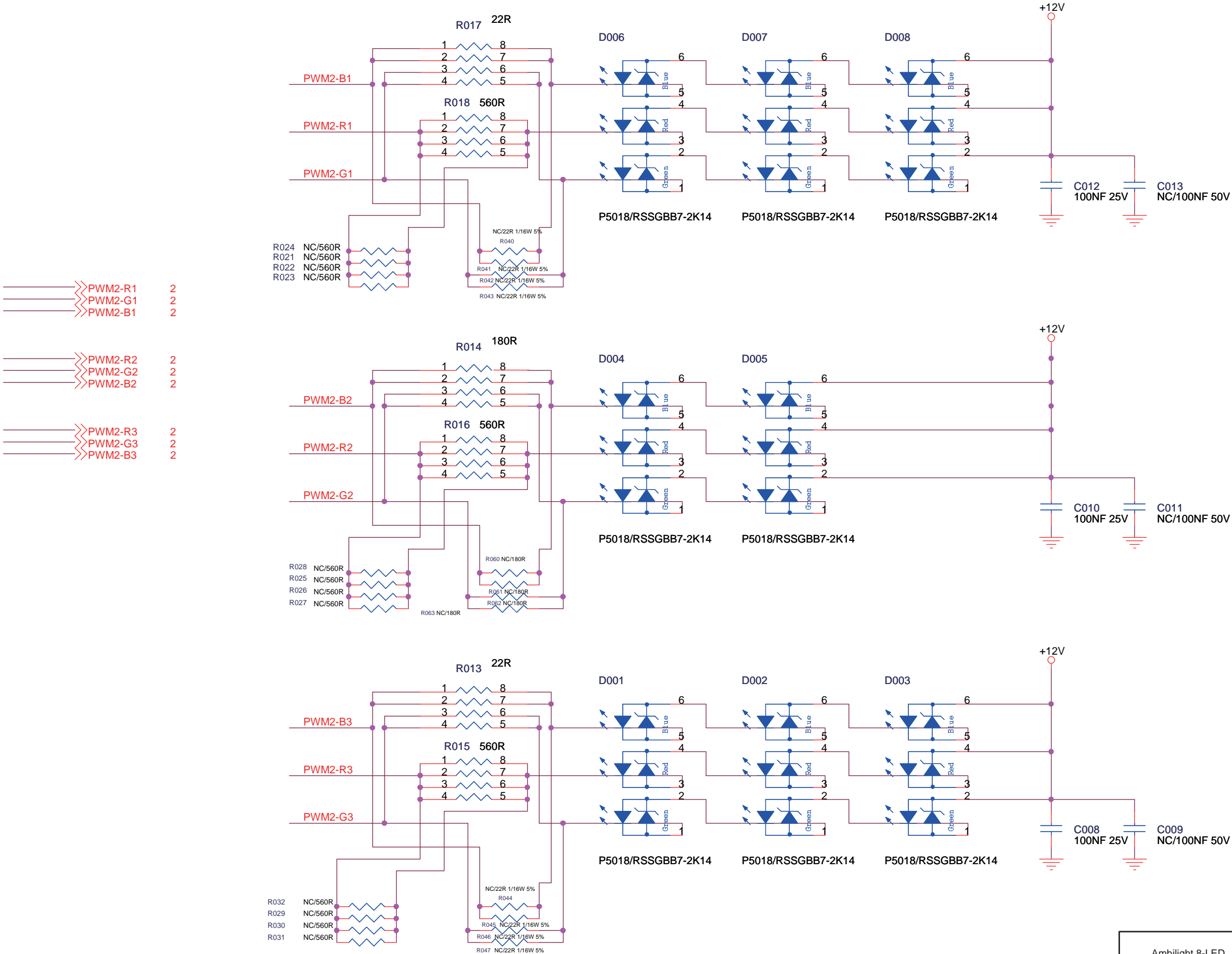
AL01



10-22-2 Ambilight 8-LED

AL02 Ambilight 8-LED

AL02



Ambilight 8-LED	715G6981	2014-05-07

10-22-3 Ambilight board layout top/bottom

Layout Ambilight Board (top side)

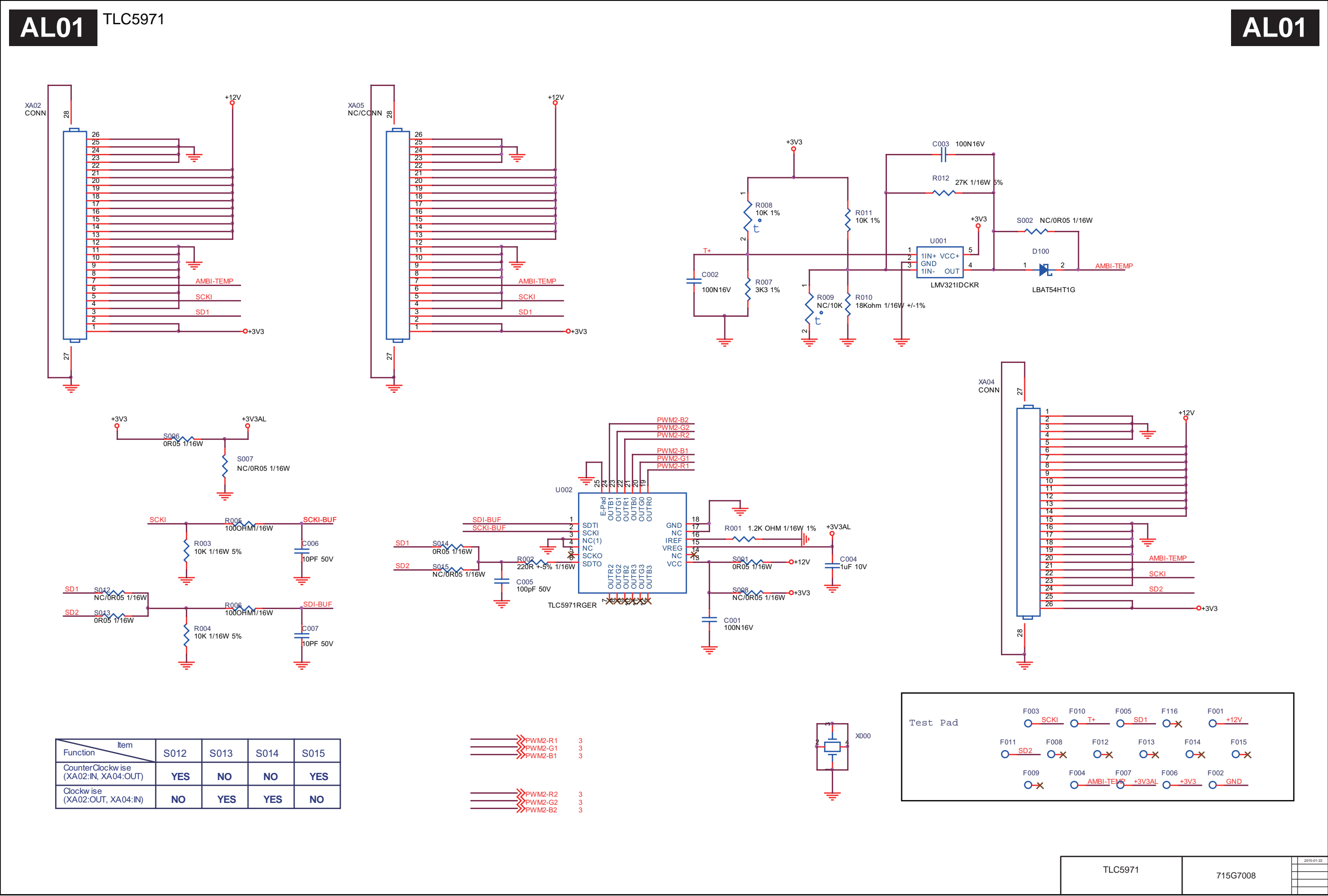


Layout Ambilight Board (bottom side)



Ambilight Board layout top/bottom	715G6981	1	2014-10-22

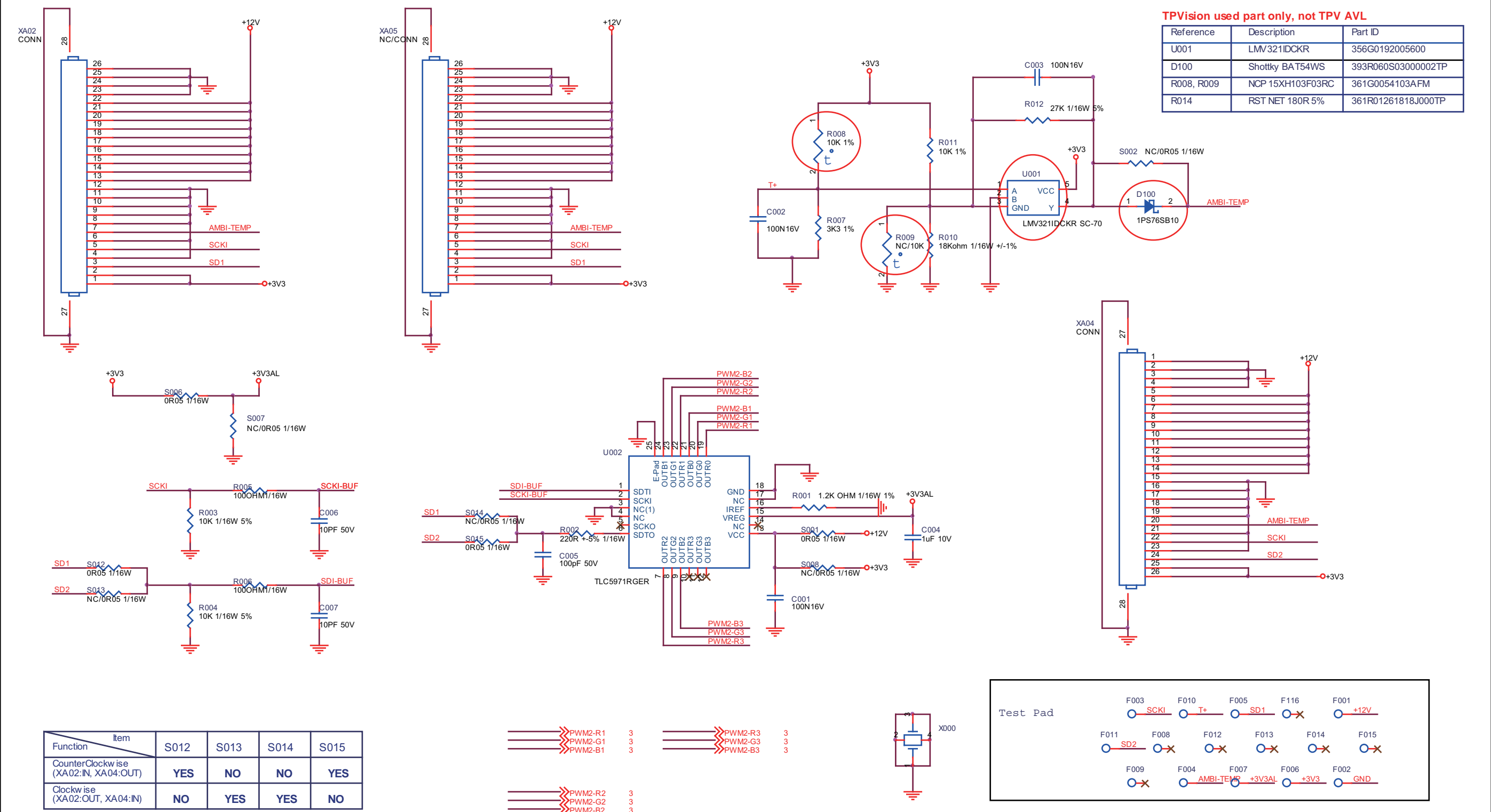
10.23 AL 715G7008 Ambilight Board
10-23-1 TCL5971



10-23-2 TCL5971_2

AL02 TLC5971_2

AL02

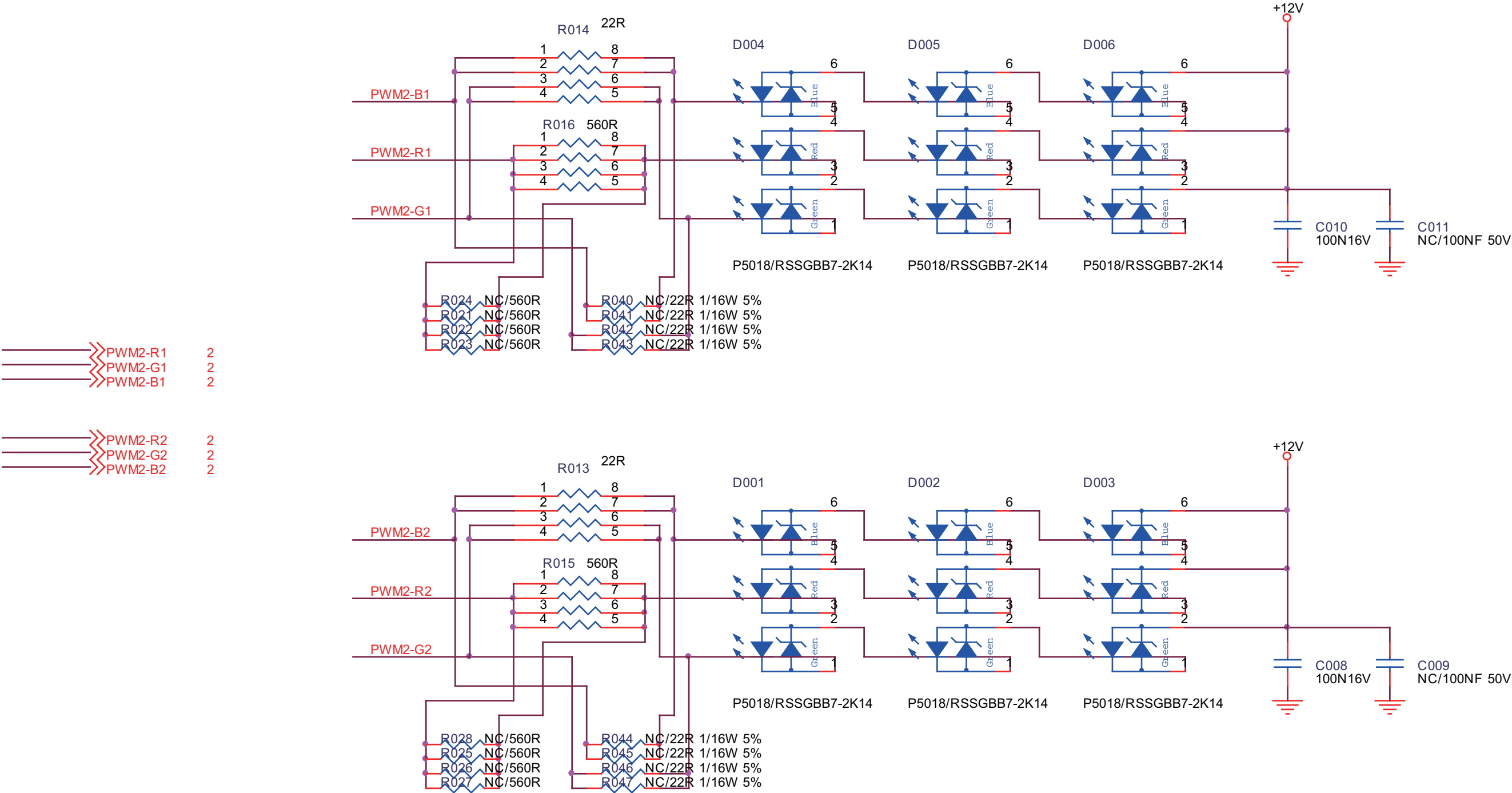


10-23-3 Ambilight 6-LED

AL03

Ambilight 6-LED

AL03



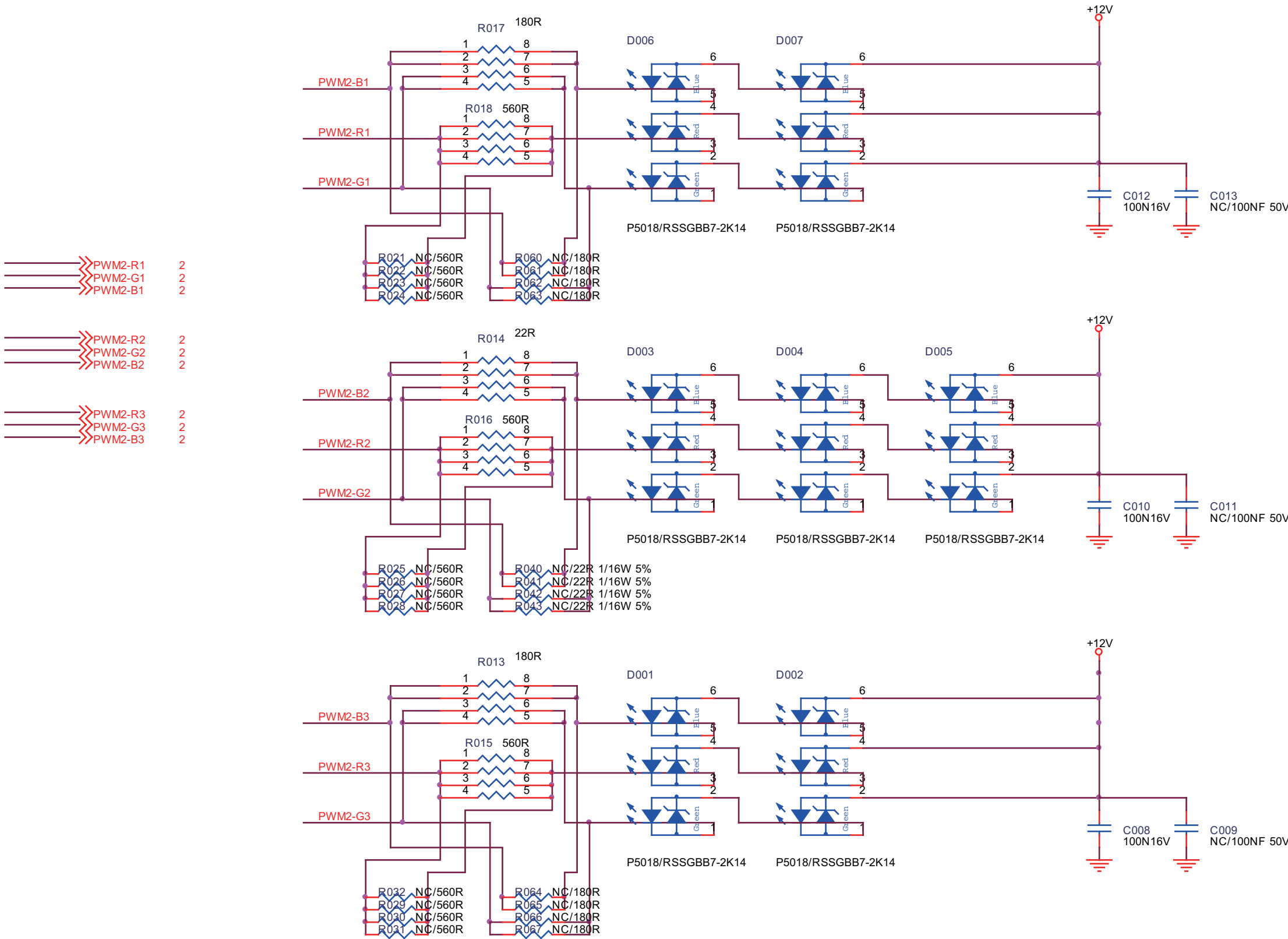
Ambilight 6-LED	715G7008	2014-12-25

10-23-4 Ambilight 7-LED

AL04

Ambilight 7-LED

AL04



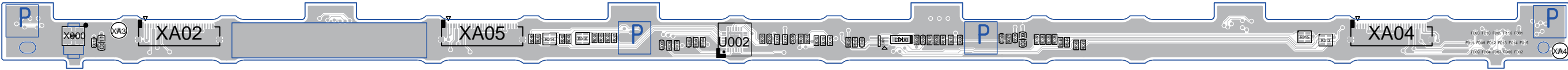
Ambilight 7-LED	715G7008	2015-01-23

10-23-5 Ambilight board layout top/bottom

Layout Ambilight board (top side)



Layout Ambilight board (bottom side)

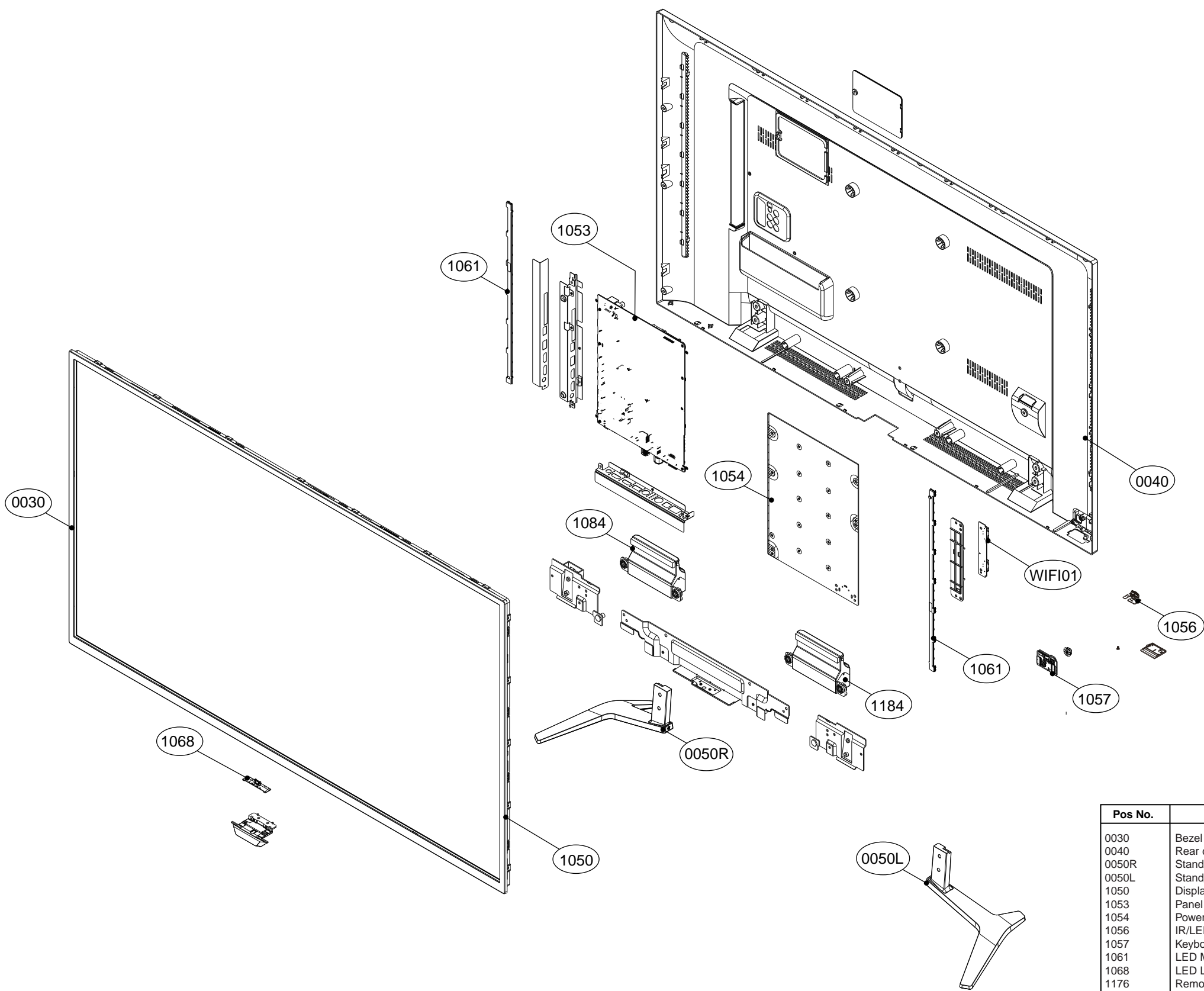


Ambilight board layout top/bottom	715G7008	2014-10-28

11. Styling Sheets

11.1 6501& 6551 series 43"

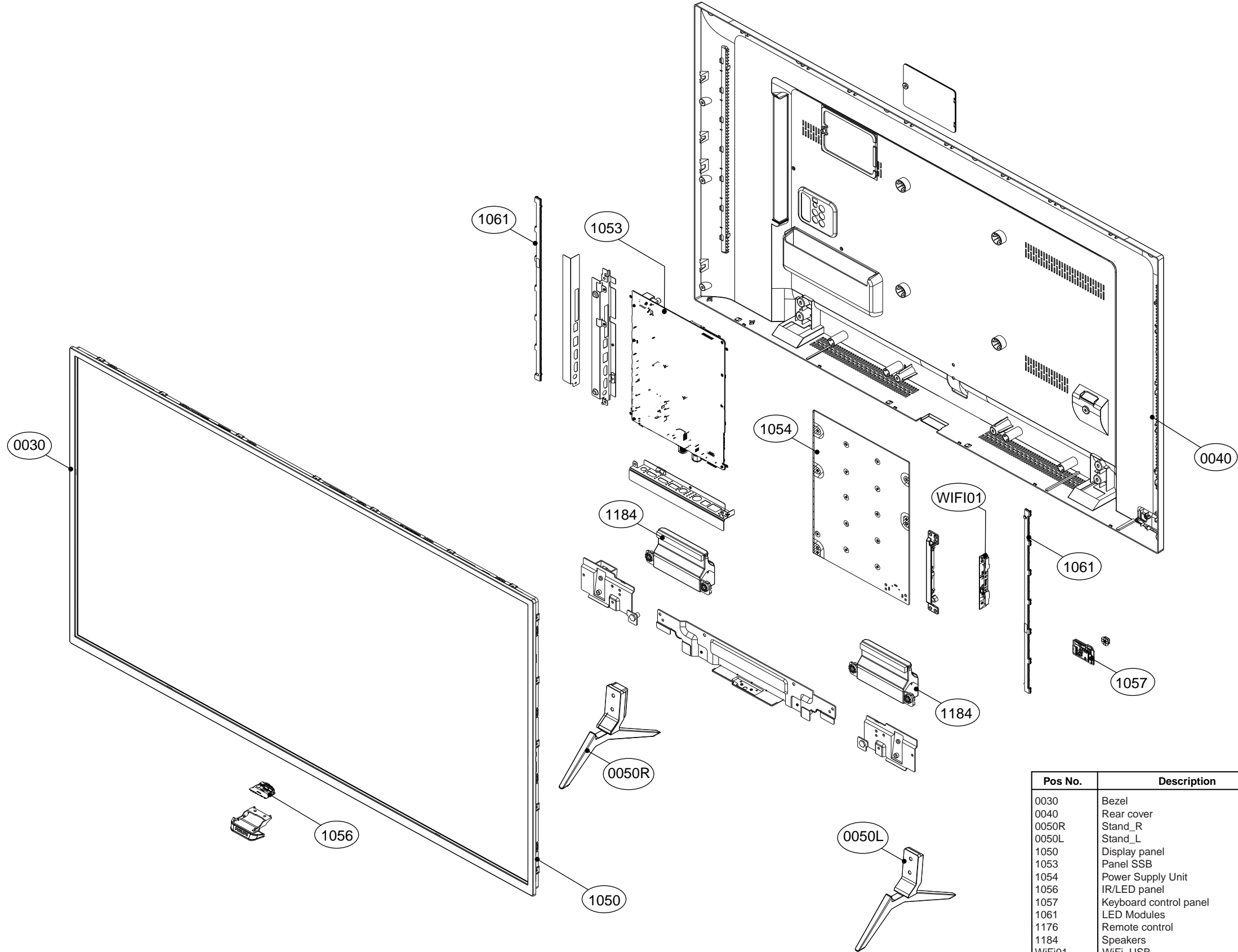
6501& 6551 series 43"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

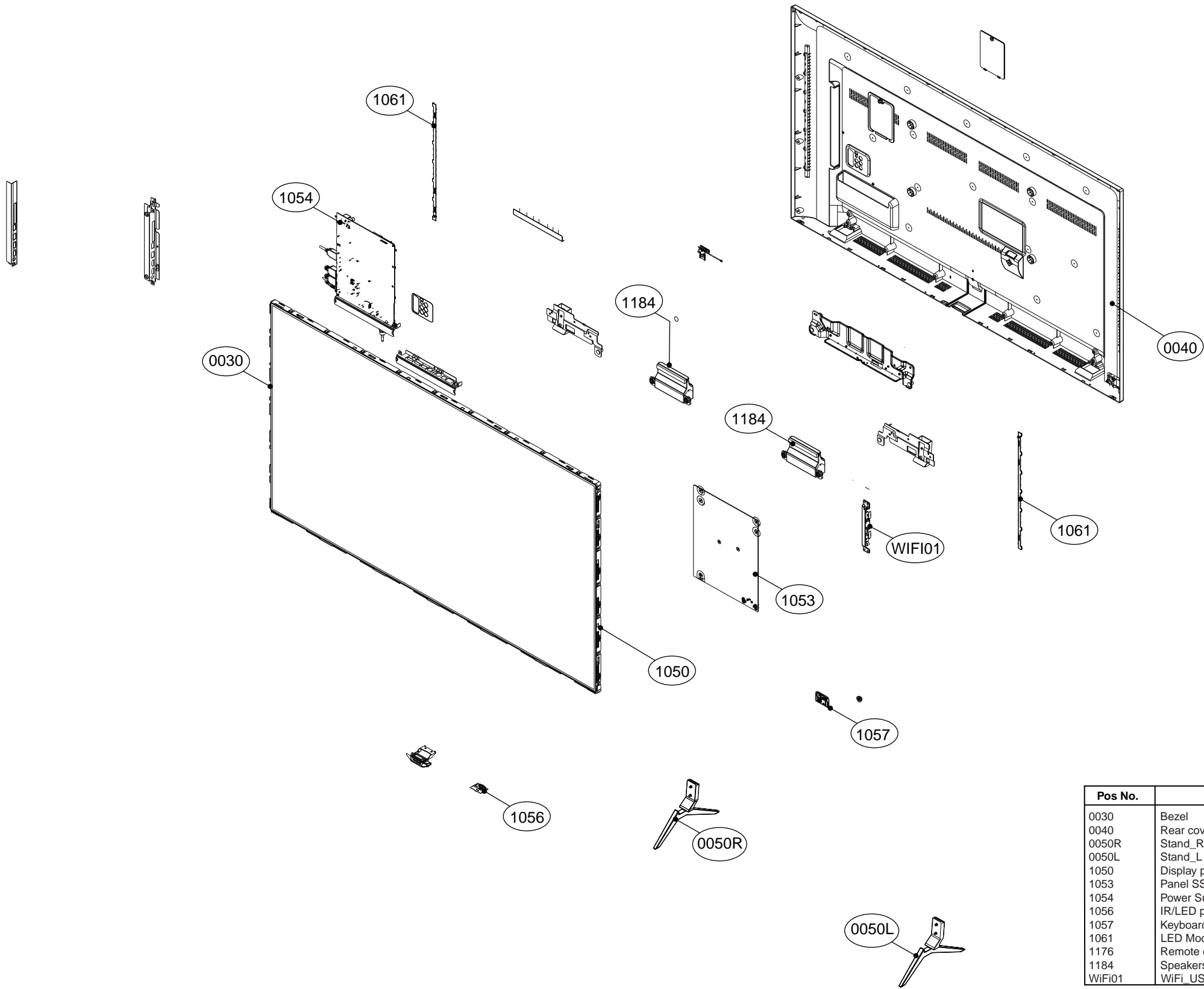
6401 series 43"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

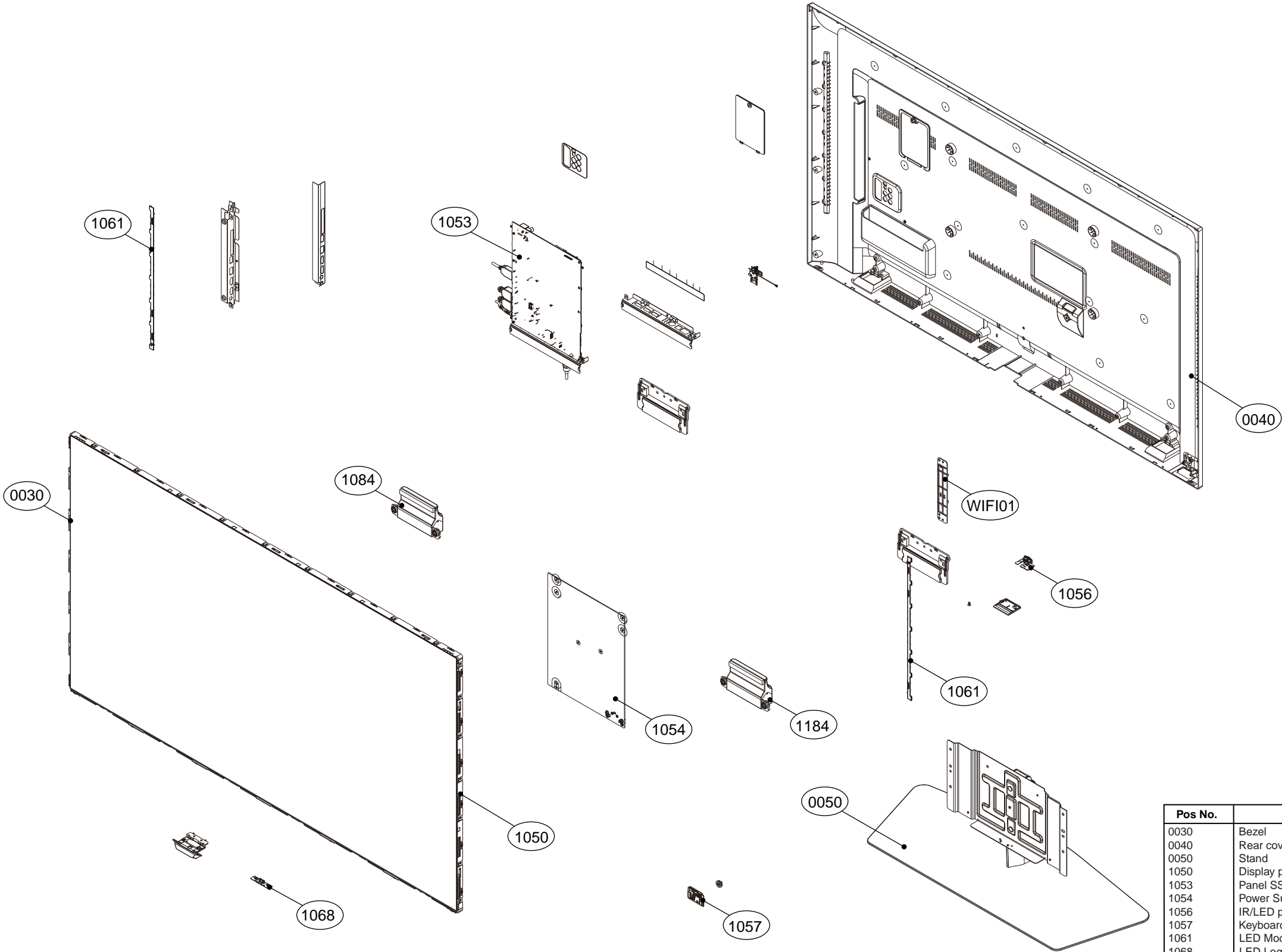
6401 series 49"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

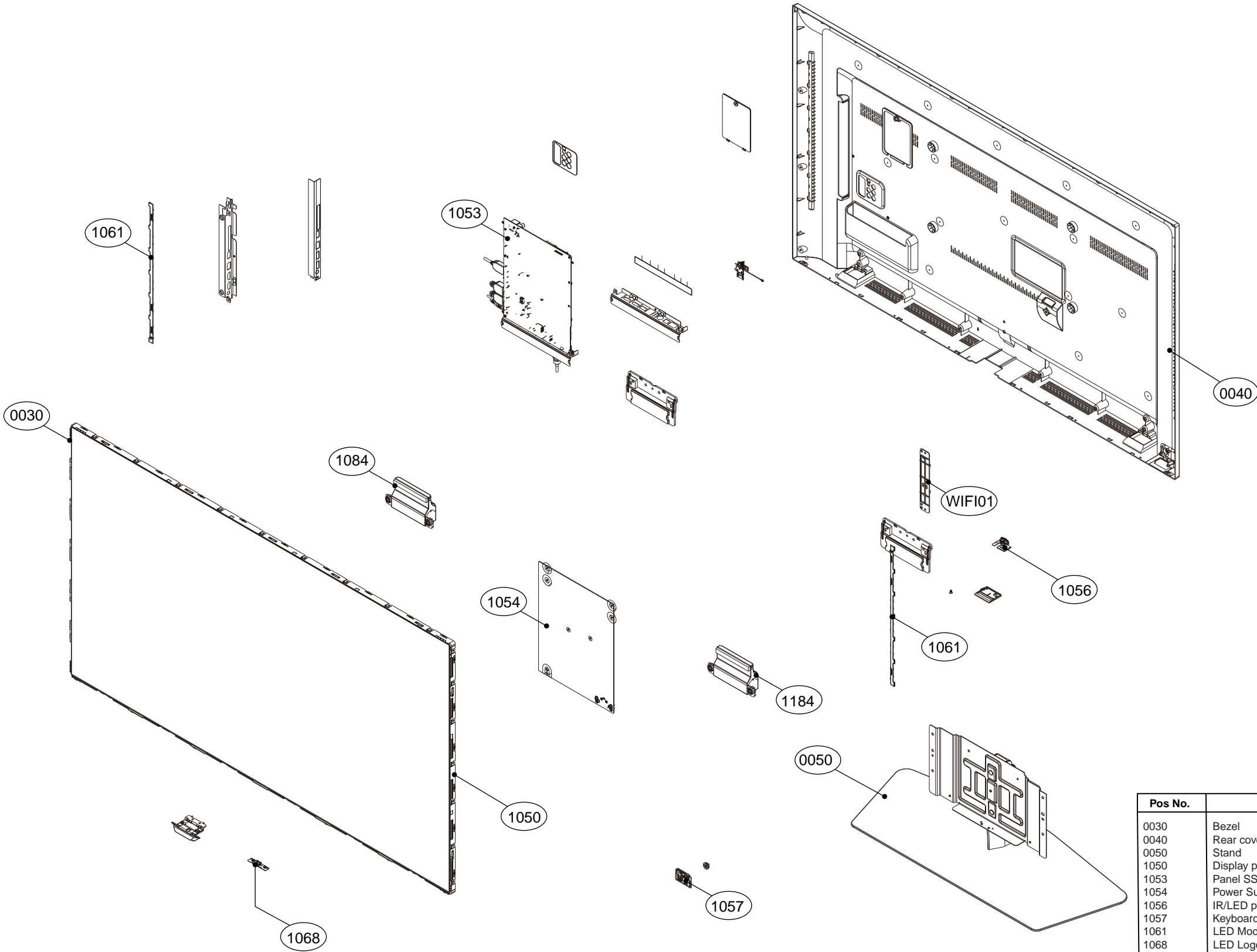
6501 & 6551 series 49"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

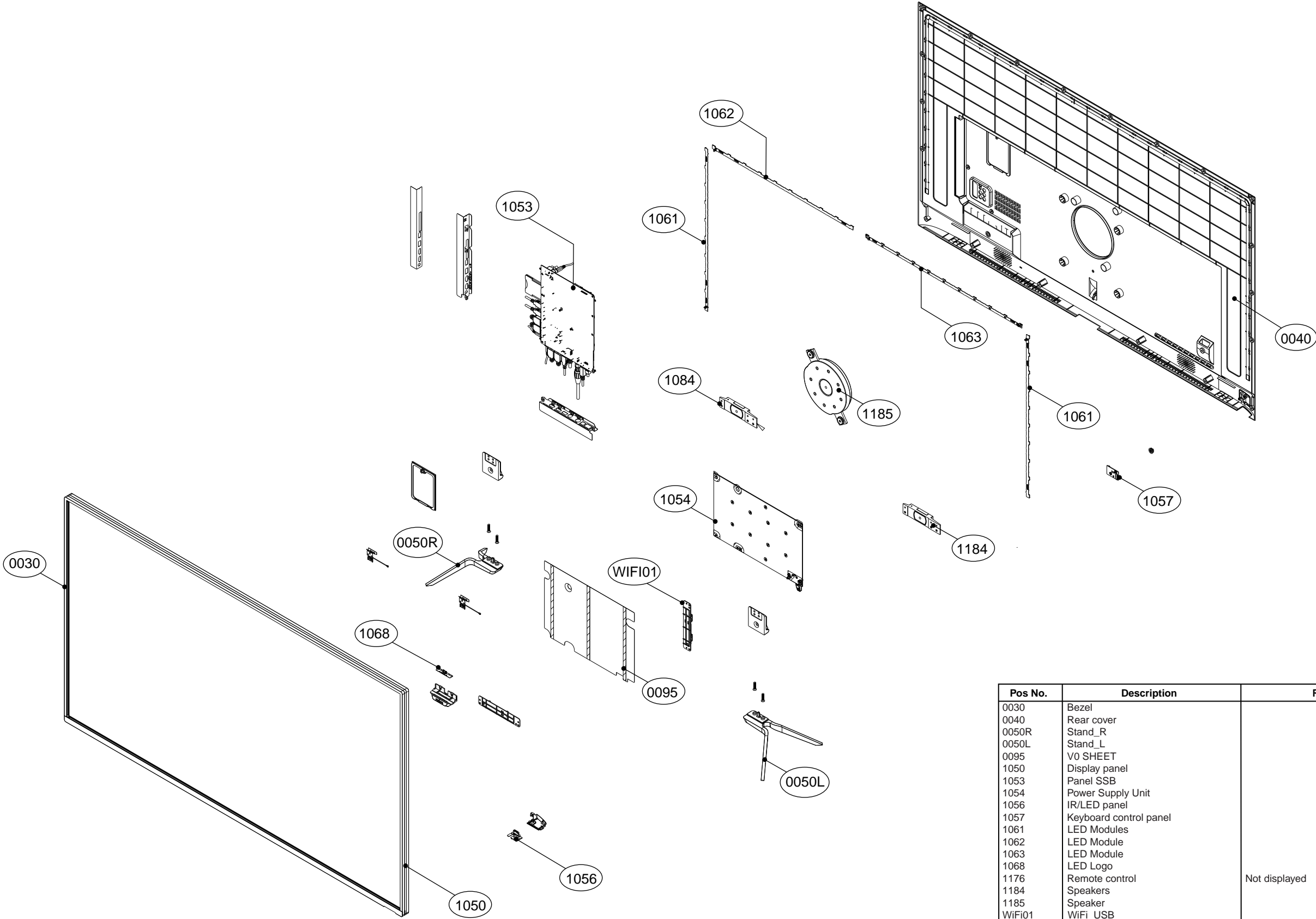
6561 & 6581 series 49"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

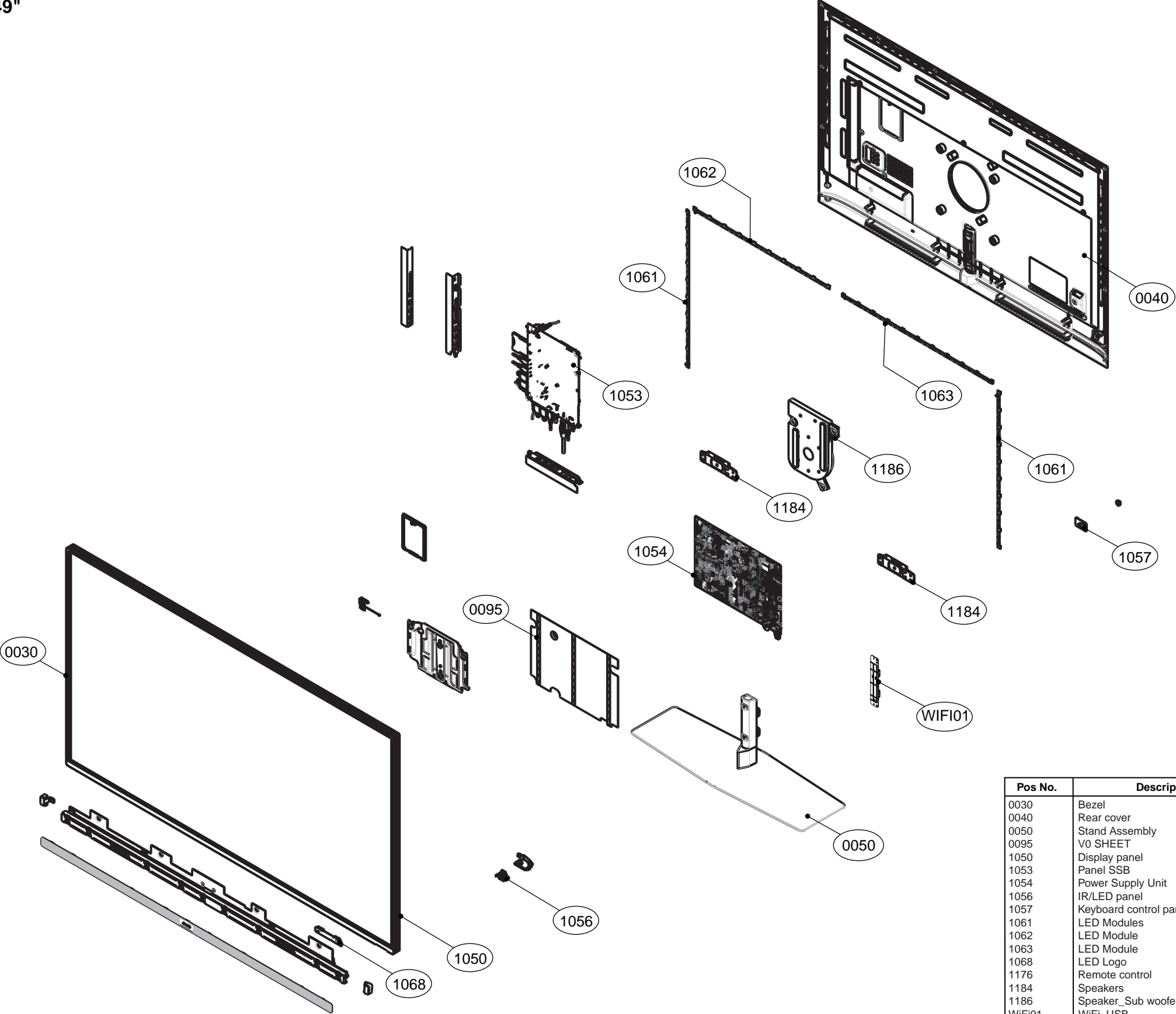
7101 series 49"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1063	LED Module	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
1185	Speaker	
WiFi01	WiFi_USB	

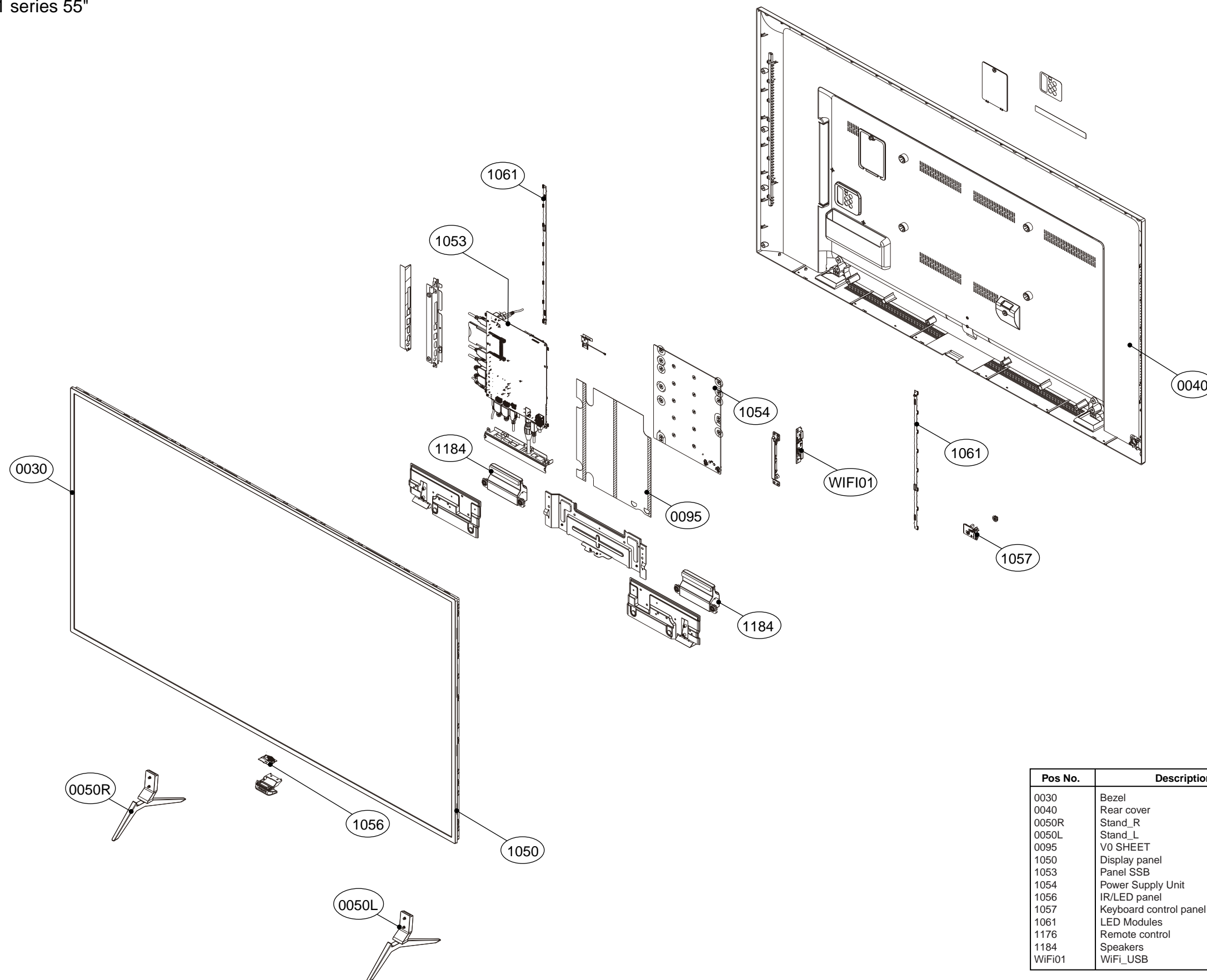
FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

7181 series 49"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1063	LED Module	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
1186	Speaker_Sub woofer	
WIFI01	WiFi_USB	

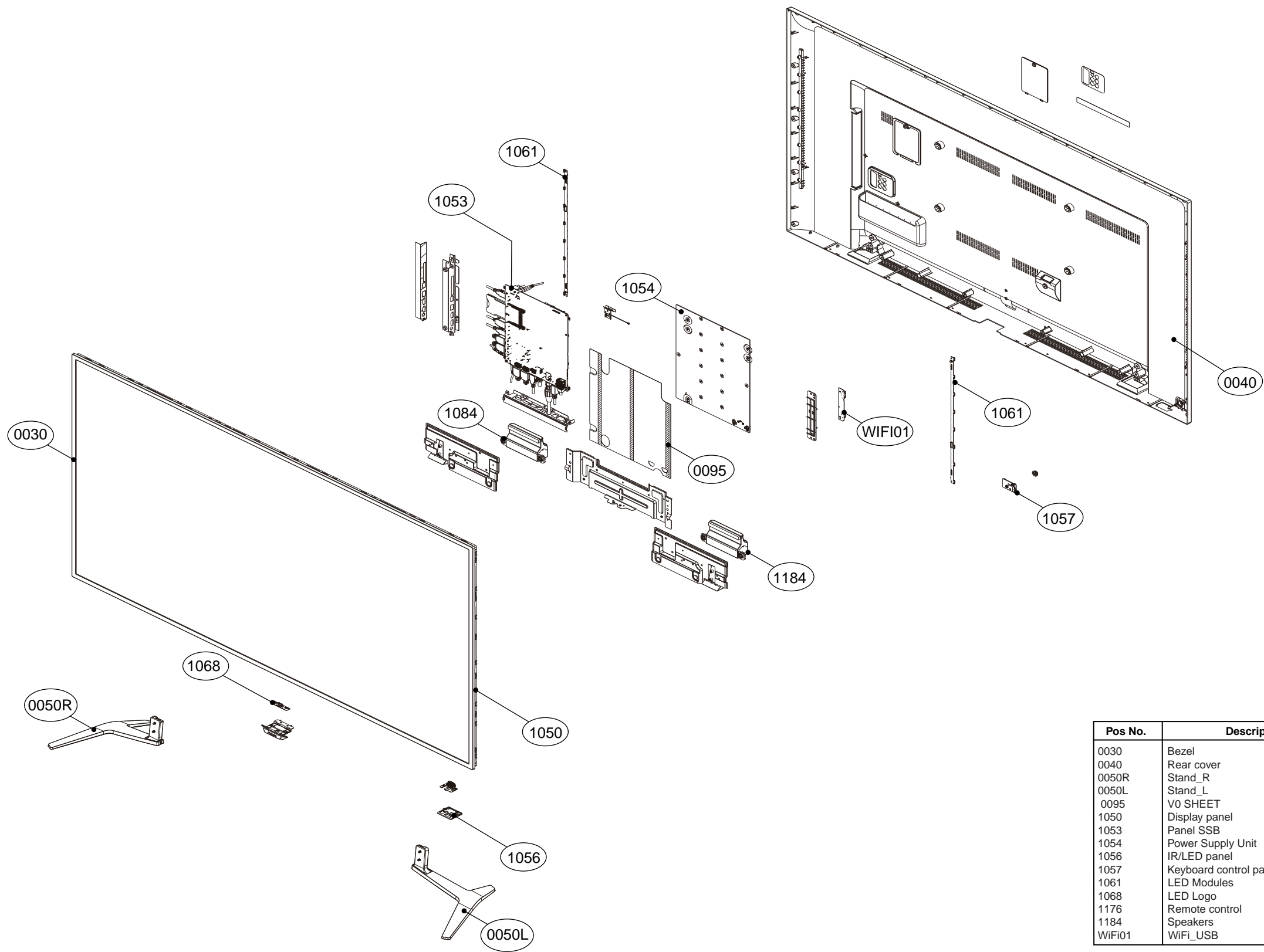
FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

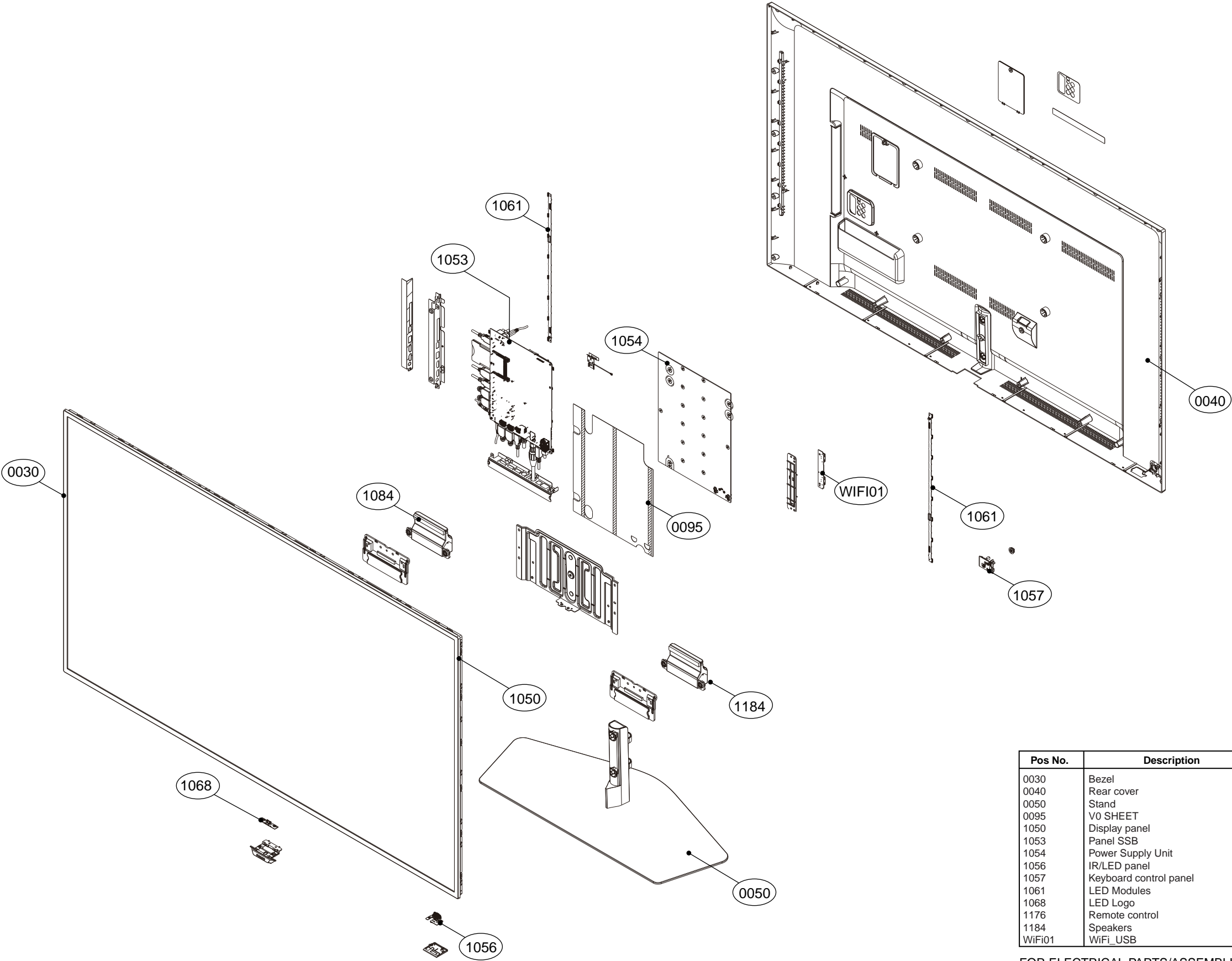
6501 series 55"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

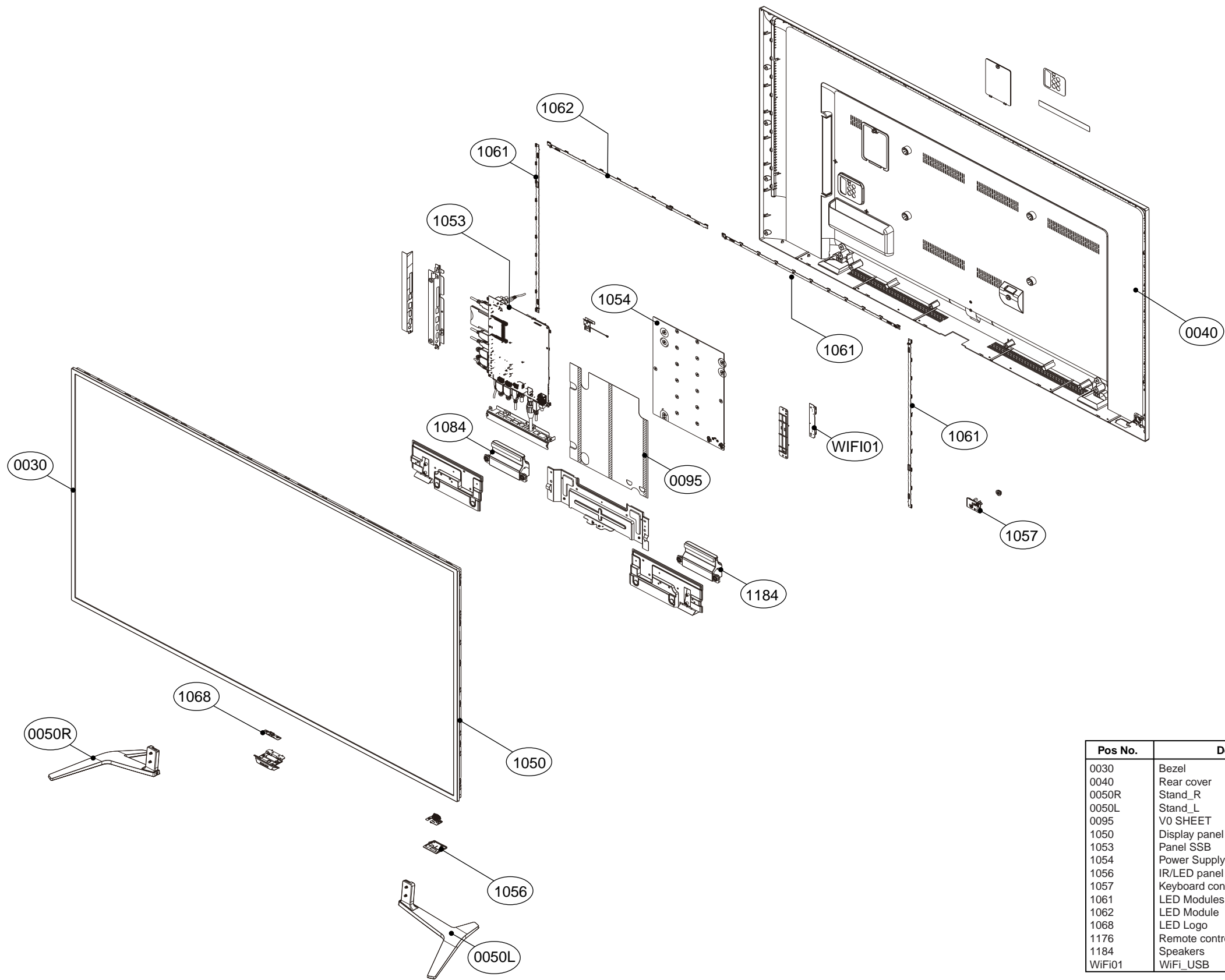
6551 series 55"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

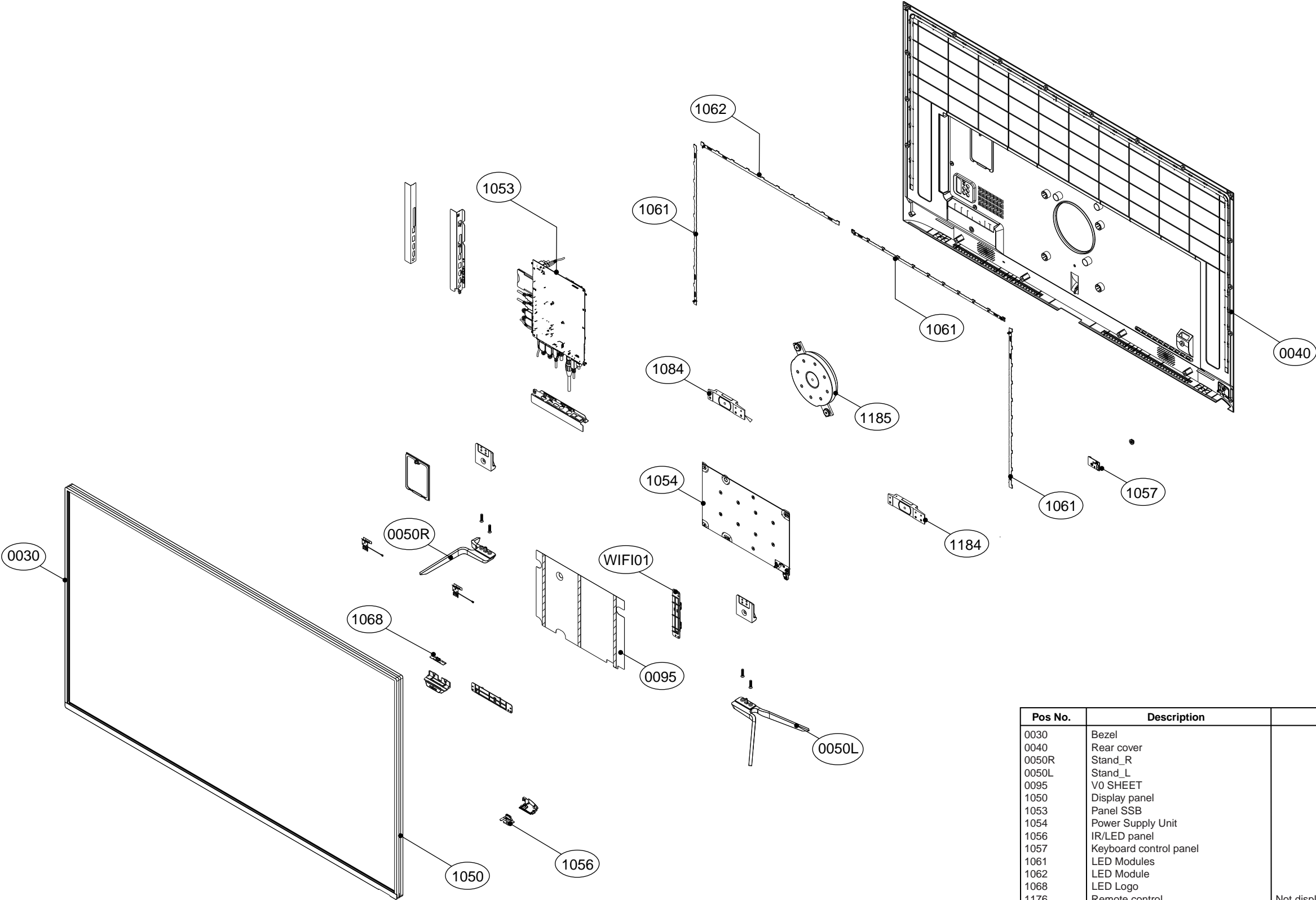
6561&6581 series 55"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1068	LED Logo	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

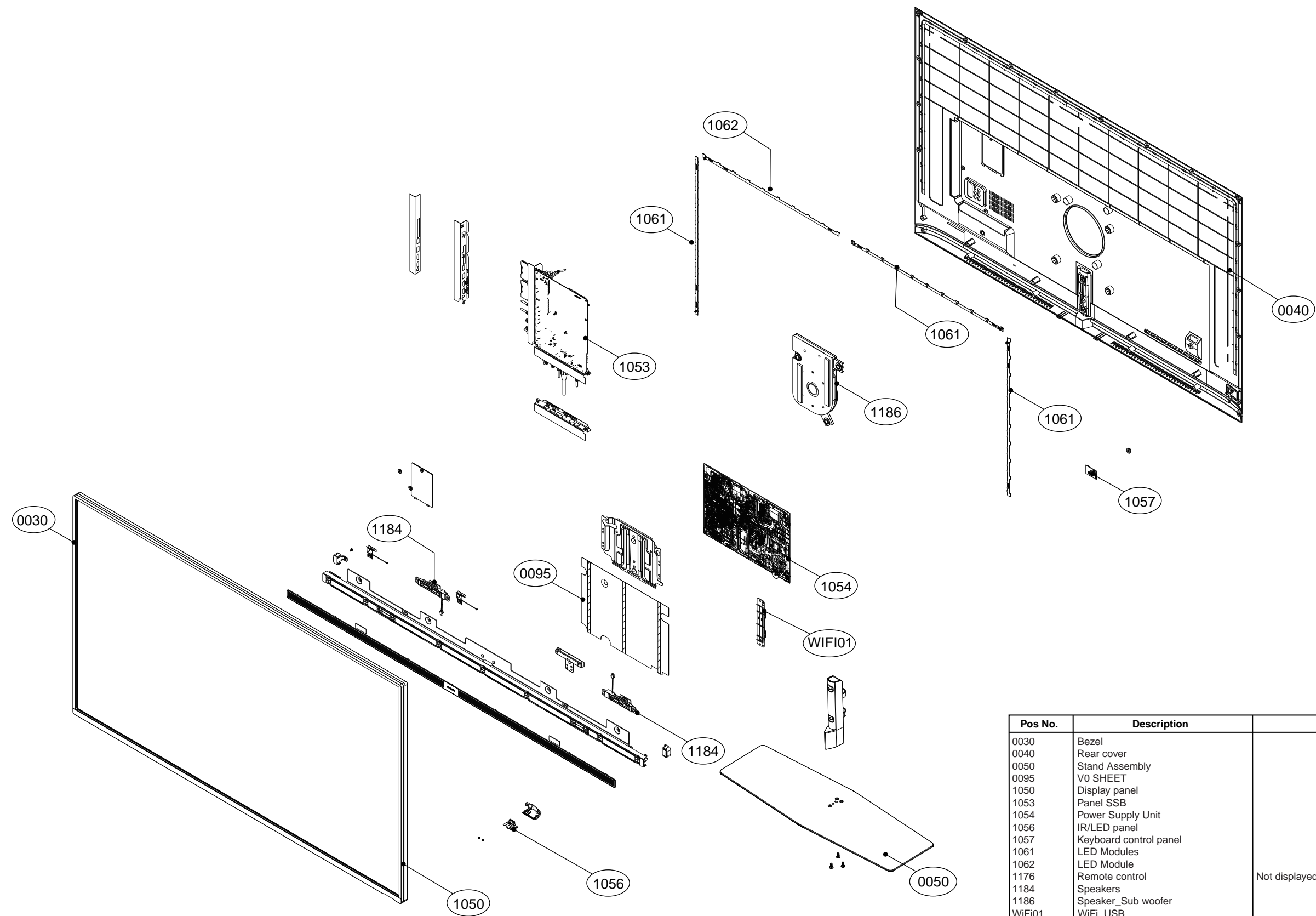
7101 series 55"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
1185	Speaker	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

7181 series 55"

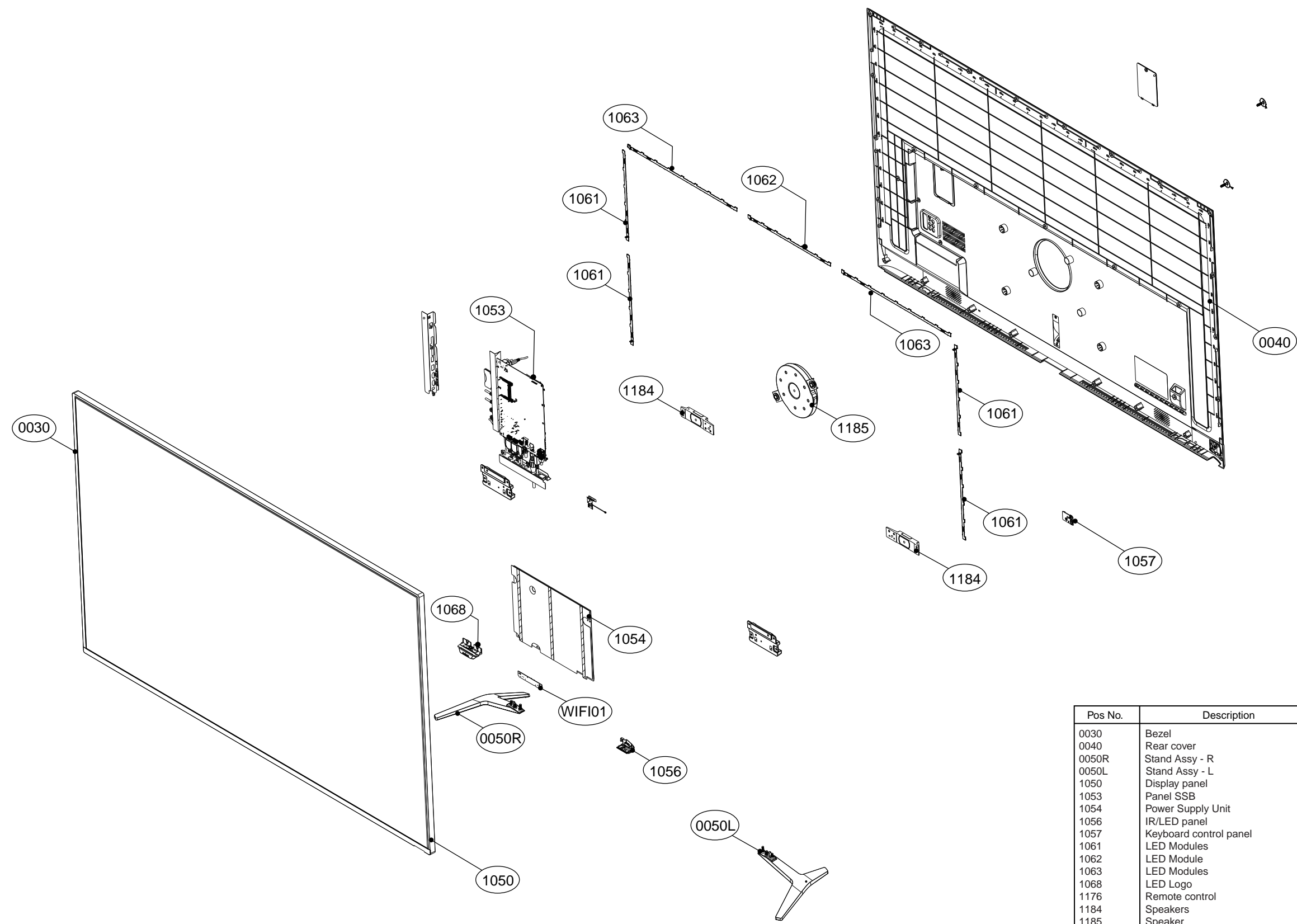


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1176	Remote control	Not displayed
1184	Speakers	
1186	Speaker_Sub woofer	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11.14 6521/7101 series 65"

6521/7101 series 65"

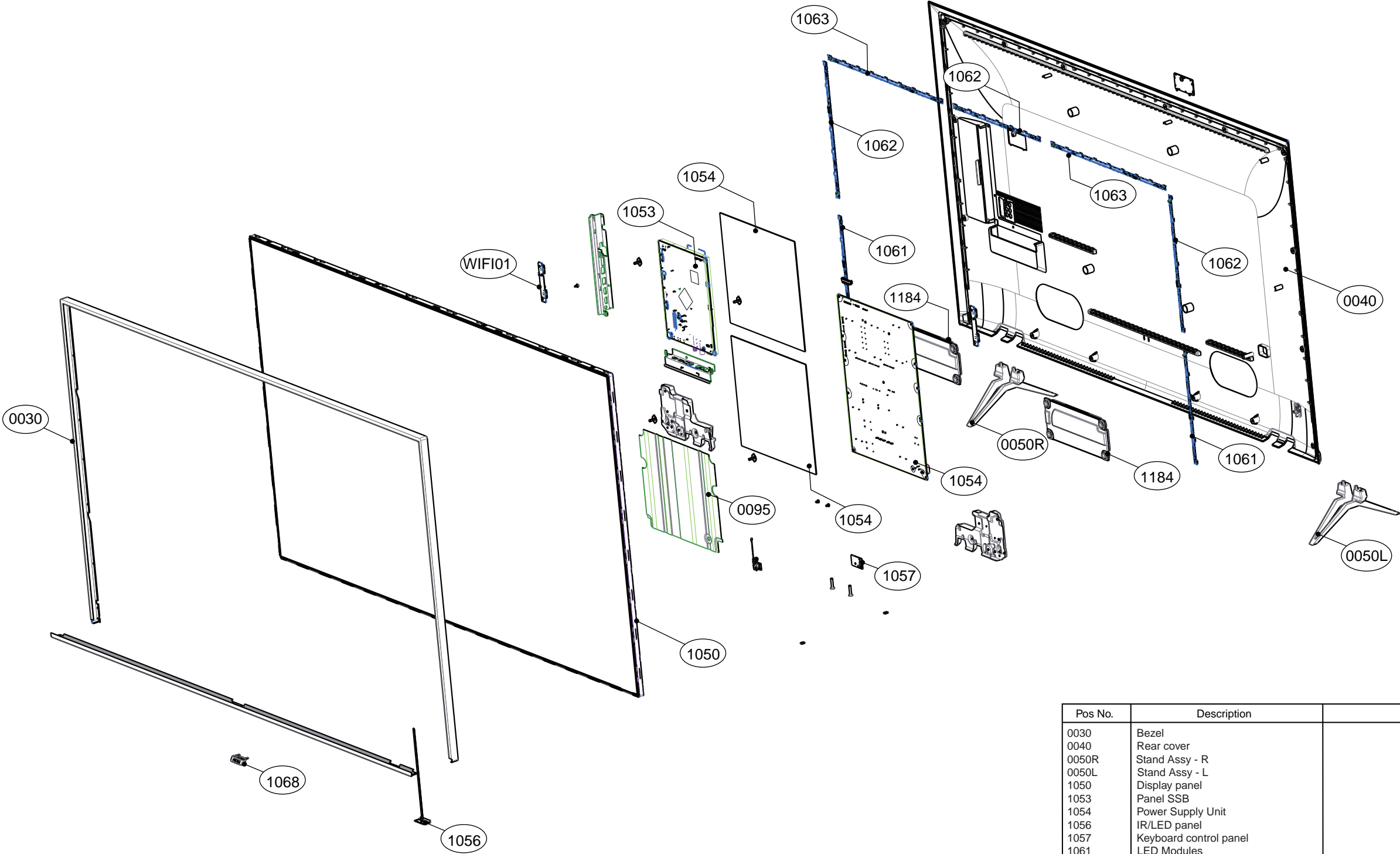


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand Assy - R	
0050L	Stand Assy - L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1063	LED Modules	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
1185	Speaker	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

20031_801.eps

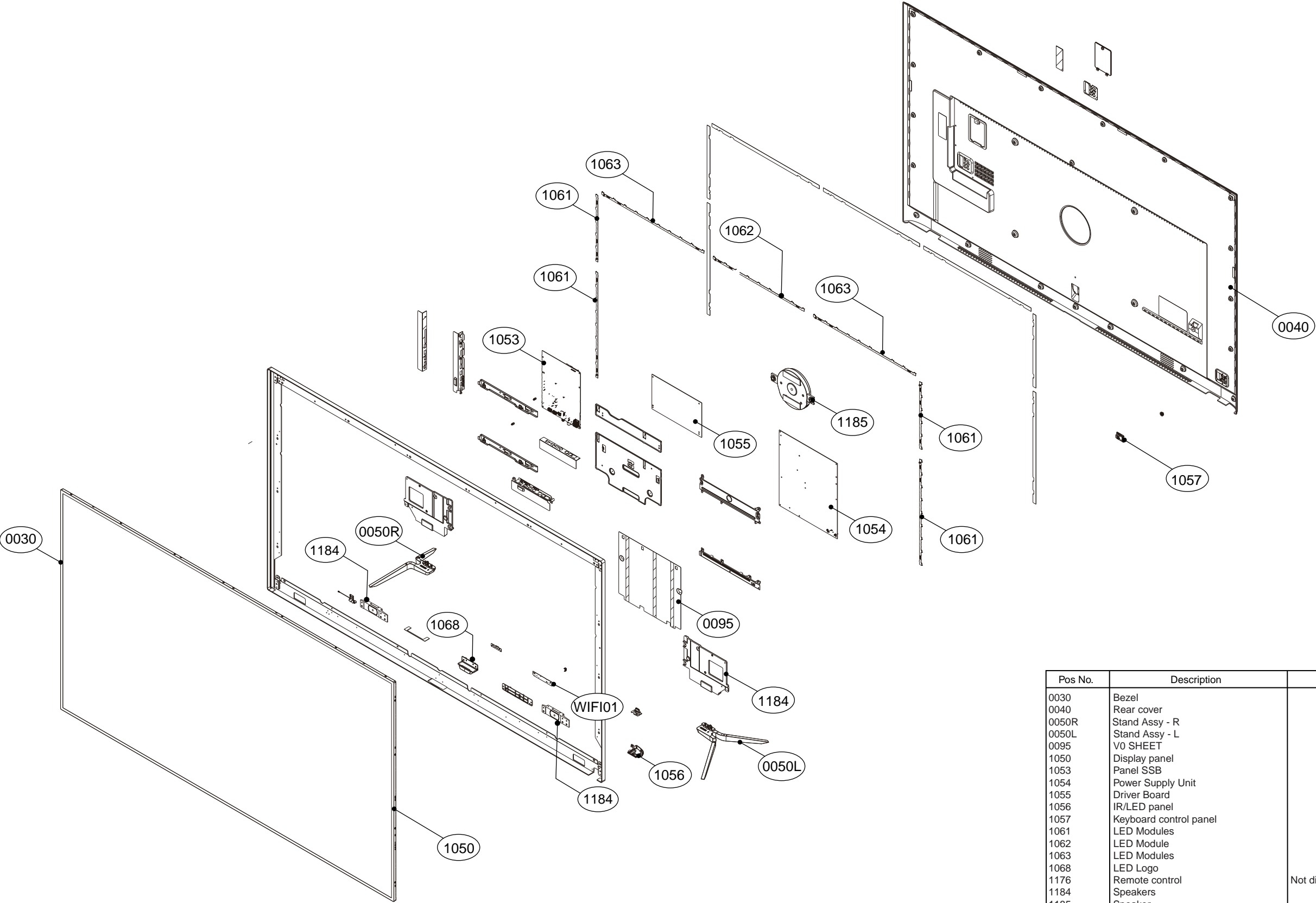
7601 series 65"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand Assy - R	
0050L	Stand Assy - L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Modules	
1063	LED Modules	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

7101 series 75"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand Assy - R	
0050L	Stand Assy - L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1055	Driver Board	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Module	
1063	LED Modules	
1068	LED Logo	
1176	Remote control	Not displayed
1184	Speakers	
1185	Speaker	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9